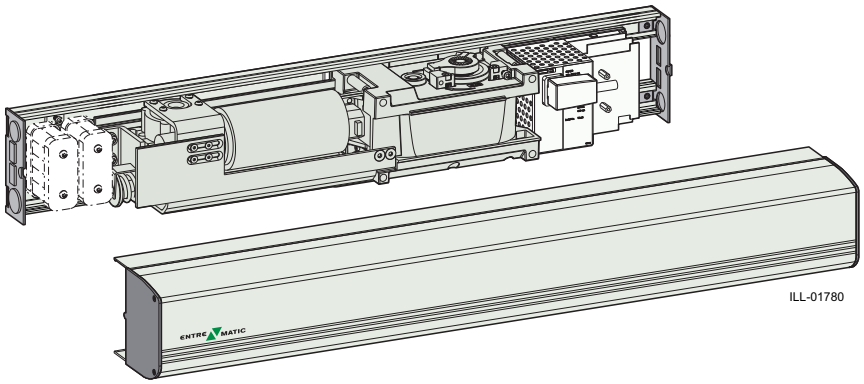
Entrematic Swing Door Operator
EMSW EMO



Installation and Service Manual - Original instructions

1005088-EMEI-6.0 – Issue 2012-02-15

© All rights in and to this material are the sole property of Ditec Entrematic Nordic AB. Copying, scanning, alterations or modifications are expressly forbidden without the prior written consent of Ditec Entrematic Nordic AB. Rights reserved for changes without prior notice.

Backtrack information: folder: Library, version: a331, date: 2012-02-15, time: 07:28:05, state: Working

CONTENTS

1 Revision 4
2 Important information 5
3 Technical specification 7
4 How the EMSW EMO works 9
5 Models 13
6 Part identification & Accessories 15
7 Pre-installation 23
8 Mechanical installation 26
9 Electrical connection 47
10 Start-up 52
11 Cover 56
12 Signage 58
13 Changing group of parameters 59
14 Classification 60
15 Advanced settings 62
16 Installation and adjustments 64
17 Installation instructions for Accessories 66
18 Troubleshooting 68
19 Maintenance plan 70

1 Revision

The following pages have been revised:

Page	Revision 5.0 → 6.0
5	Module text updated
7	Technical specification updated
22	Middle piece kit added
57	Middle piece cover added

2 Important information

HAZARD WARNING!

Failure to observe the information in this manual may result in personal injury or damage to equipment.

Save these instructions for future reference.

2.1 Intended use

The door is designed to offer continuous use, a high degree of safety and maximum lifetime.

The Entrematic EMSW EMO is an automatic swing door operator developed to facilitate entrances to buildings and within buildings through swing doors. The EMSW EMO is a low-energy operator using a DC motor and a gear-reduction system to drive an arm system, which opens the door. It is to be installed indoors where it is suitable for almost all types of external and internal swing doors. This widely-used operator can be found on applications ranging from handicapped-access in private homes to high-traffic retail operations.

The motor, oil pump and gear system are combined into a compact unit mounted alongside the control unit within the cover. The operator is connected to the door leaf with different arm systems.

For use see User manual 1005099.

2.2 Safety precautions

Do not climb on door parts.

Do not let children play with the door or the fixed controls.

Be sure to complete the site acceptance test before taking the door into operation, see PRA-0007.

To avoid bodily injury, material damage and malfunction of the product, the instructions contained in this manual must be strictly observed during installation, adjustment, repairs and service etc. Training is needed to carry out these tasks safely. Only Entrematic-trained technicians should be allowed to carry out these operations.

2.3 Electronic equipment reception interference

The equipment complies with the European EMC directive (US market FCC Part 15), provided installed according to Installation and Service manual.

The equipment may generate and use radio frequency energy and if not installed and used properly, it may cause interference to radio, television reception or other radio frequency type systems.

If other equipment does not fully comply with immunity requirements interference may occur. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined

by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient the receiving antenna.
- Relocate the receiver with respect to the equipment.
- Move the receiver away from the equipment.
- Plug the receiver into a different outlet so that equipment and receiver are on different branch circuits.
- Check that protective earth (PE) is connected.

If necessary, the user should consult the dealer or an experienced electronic technician for additional suggestions.

2.4 Environmental requirements

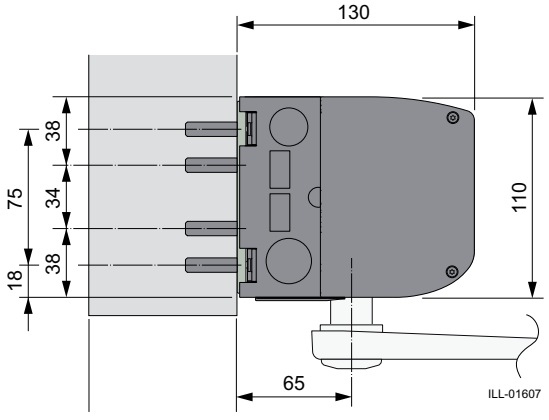
Entrematic products are equipped with electronics and may also be equipped with batteries containing materials which are hazardous to the environment. Remove this material from the operator before it is scrapped and make sure that it is disposed of properly as was done with the packaging.

This manual contains the necessary details and instructions for the installation, maintenance and service of the Swing Door Operator Entrematic EMSW EMO.

3 Technical specification

Manufacturer:	Ditec Entrematic Nordic AB
Address:	Lodjursgatan 2, SE-261 25 Landskrona, Sweden
Type:	EMSW EMO
Power supply:	100-240 V AC +10/-15%, 50/60 Hz
Power consumption:	max. 75 W
Auxiliary voltage:	24 V DC, max. 400 mA
Internal control fuse:	2 x T 6,3 AH 250 V
Door width:	max. 1200 mm
Electro-mechanical locking device:	Selectable: 12V DC, max. 500 mA / 24 V DC, max. 250 mA
Door weight:	45-90 kg
Door opening angle:	PUSH arm: 80° - 110°, with reveal 0 - 100 mm (300 mm with longer telescopic part)
	PULL arm: 80° - 110°, with reveal 0 - 130 mm
Opening time (0° - 80°):	variable between 3 - 6 seconds
Closing time (90° - 10°):	variable between 3 - 6 seconds
HOLD open time:	1,5-30 seconds
Ambient temperature:	-20 °C to +45 °C
Degree of protection:	IP 20
Degree of protection, control actuators:	IP54
Relative humidity (non-condensing):	Max. 85%
Approvals:	Third party approvals from established certification organizations valid for safety in use and escape route safety. For details see Declaration of Conformity.

This product is to be installed internally.



Classification to DIN 18650-1							
Digit 1	Digit 2	Digit 3	Digit 4	Digit 5	Digit 6	Digit 7	Digit 8
1	3	1	0	3	0	0	2

Type of drive, digit 1.	1	swing door drive
Drive durability, digit 2.	3	1 000 000 test cycles, at 4 000 cycles/day
Type of door leaf, digit 3.	1	swing door
Suitability for use as a fire protection door, digit. 4	0	not suitable for use as a fire protection door
Drive safety devices, digit 5.	3	low energy
Special requirements for drives/functions/fittings, digit 6.	0	no special requirements
Safety at door leaf or leaves, digit 7.	0	no safety devices
Ambient temperature, digit 8.	2	−15 °C to +50 °C

4 How the EMSW EMO works

The swing door operator EMSW EMO uses a DC motor and a gear-reduction system to drive an arm system, which opens the door. Closing power is provided by a motor and a clock spring. An electronic control unit uses a motor encoder and a microprocessor to control the door's movement.

4.1 Opening

When an opening signal is received by the control unit, the door is opened at the operator-adjusted opening speed. Before the door is fully open at back check, it slows automatically to low speed. The motor stops when the selected door opening angle has been reached. The open position is held by the motor.

If the door is obstructed while opening, it will either stall or stop which can be selected with a DIP-switch (SOS).

- When stalling - the door will continue to try to open during the hold open time.
- When stopping - the door will, even if hold open time has not expired, close after 2 seconds.

4.2 Closing

When the hold open time has elapsed, the operator will close the door automatically, using spring force and motor. The door will slow to low speed at latch check before it reaches the fully closed position. The door is kept closed by spring power or extended closing force by the motor.

4.3 Functions on the basic control unit CU-ESD

Also see page 48.

4.3.1 Power failure

During power failure the operator acts as a door closer with controlled closing speed.

4.3.2 Spring force

The operator is delivered with spring pre-tension factory set to 210°. If necessary, the spring tension can be electronically adjusted with a potentiometer to required closing force.

4.3.3 Extended closing force/torque (CLTQ)

If the potentiometer CLTQ is set to 0°, the door will close with normal spring power. If the potentiometer is turned clockwise, the motor will increase the closing force/torque.

4.3.4 Power assist (POAS)

If the potentiometer POAS is set to 0°, the door gives no power assist. If the potentiometer is turned clockwise, the motor will give/increase power assist when the door is opened manually.

4.3.5 Push and go (PAG)

DIP-switch to select PUSH and GO, ON or OFF. PUSH and GO is available from any door position. PUSH and GO is not active in programme selector setting OFF.

4.3.6 Overhead presence detector (OPD), frame mounted

When an OPD sensor is mounted on the frame or operator cover just above the swing side of the door, it will–when activated–either keep the door open or closed. The sensor is not active during opening and closing. Lock-out signal must be connected for proper function.

- a closed door will not open, if the OPD detects activity in the field
- an open door will not close, if the OPD detects activity in the field
- during opening, the door will continue to open, even if the OPD detects activity in the field
- during closing, the door will continue to close, even if the OPD detects activity in the field
- the OPD is not active in program mode OFF, manually opened door or during battery operation (Power Save Mode).

4.3.7 Mat

Mat safety means that:

- a closed door will not open, if someone steps on the mat
- an open door will not close, if someone steps on the mat
- during opening, the door will continue to open, even if someone steps on the mat
- during closing, the door will continue to close, even if someone steps on the mat
- opening impulses are prevented during closing, if someone steps on the mat
- the mat is not active in program mode OFF, manually opened door or during battery operation (Power Save Mode).

4.4 Functions on the extension unit EXU-SI

Also see page 50.

4.4.1 KILL function

- If KILL circuit is closed, the control will ignore all signals and close door(s) at normal speed.
- When KILL is no longer active, operator will resume normal operation.
- If KILL function must have manual reset, jumper must be removed and reset button connected to terminal No. 8 and Ground.
- The lock will lock when KILL is active regardless of program selector setting.
- The function of the lock can be changed during KILL .
- In a double door application, KILL is only connected to the master operator.

4.4.2 Function of locks

- The lock output is short circuit proof and can source a lock with 12 V DC, max. 500 mA or 24 V DC, max 250 mA. Lock function is active in programme selection EXIT and OFF
- DIP-switch to select 12 or 24 V DC
- DIP-switch to select locked with or without power
- DIP-switch for lock release and potentiometer for opening delay
- DIP-switch for lock kick if door is not fully closed, to overcome binding in the locking device during closing
- Input to unlock signal from lock. Potentiometer for opening delay is to be set to max. As soon as unlock signal is received the door will start to open. The output signal shall be active low.
- If a Multi Strike of type Solid 75, Solid 575, Robust 280 or Robust 281D is used, an adapter board (MUL) is needed. The board shall be connected between the ordinary Lock output on

the EXU-SI board and the strike. The function switch for lock voltage must be in the 12V position.

4.4.3 Program selector

- Input for OPEN, EXIT and OFF (if no program selector, AUTO is default).

4.4.4 Impulses

- Input for OUTER impulse, KEY impulse and OPEN/CLOSE impulse.

4.4.5 OPEN/CLOSE impulse

The impulse will open the door and the door will stay open until a new impulse is given. If no impulse is given the door will close after 15 minutes. This can be made infinite by changing group of parameters .

OPEN/CLOSE impulse works only in program selection ON.

4.4.6 Power failure mode (backup batteries are installed) – optional

- In case of power failure, normal operation can be carried out with impulses from the KEY SWITCH.
- Two contacts are available for connection of 2 x 12 V batteries (NiMH)
- DIP-switch for monitoring of batteries is also available. Faulty battery will be indicated by the LED on the CU-ESD. If selected the relay on EXU-SA can give a contact information. An audible warning signal can be achieved by using the accessory board AIU. It is connected to the 24 VDC and plugged into the EXU-SA relay output terminal.
- During POWER FAILURE MODE the operator will finish the actual operating cycle and then switch of the battery supply. The battery powered operator can be reactivated to achieve a new operating cycle by an impulse on the KEY input.
- The operating mode during battery power can be changed from POWER SAVE to CONVENIENCE . During CONVENIENCE MODE the operator will work as normal until the batteries are discharged. The batteries are rechargeable and will be charged by the control unit in the operator. New, fully charged batteries can typically open and close a door max. 300 times in convenience mode. In power save mode the operator can stand-by in up to 1 week, waiting for KEY impulse.

4.5 Functions on the extension unit EXU-SA – optional

Also see page 51.

4.5.1 Presence impulse approach, door mounted

The presence impulse is active during fully open and closing. The sensor is mounted to the approach side of the door. Once the door is closed, the sensor is ignored and will not be active until the next impulse is received.

Note! When installed as a pair of doors, the presence impulse signal will re-open both doors. The sensor is not active in program mode OFF, manually opened door or during battery operation (Power Failure Mode).

4.5.2 Presence detection swingpath, door mounted

When a sensor that is mounted on the swing side of a door detects an object, it will send a command to the control unit to stall the door. If the control unit has received a short signal from the sensor and there is still hold open time left on the control unit, the door will continue on its way open if the object has cleared.

The inhibit/blanking potentiometer can be adjusted so that the sensor will avoid detecting a wall or object near the full open position. Presence detection has a higher priority than presence impulse.

Note! When installed as a pair of doors the presence detection signal will stop both doors, except for double egress doors. The behavior for double egress doors can be changed . The sensor is not active in program mode OFF, manually opened door or during battery operation.

4.5.3 Monitored safety sensors

Both presence impulse and presence detection can be monitored. If a sensor becomes defective, the operator will not accept any impulses and will then work as a manual door closer.

4.5.4 Open door indication

A relay output is used to indicate an opening cycle or a specific position of the door. The indication position is set by adjusting the inhibit/blanking potentiometer.

4.5.5 Error indication

A potential free contact COM/NO/NC for external error indication “Error indication” on page 69.

5 Models

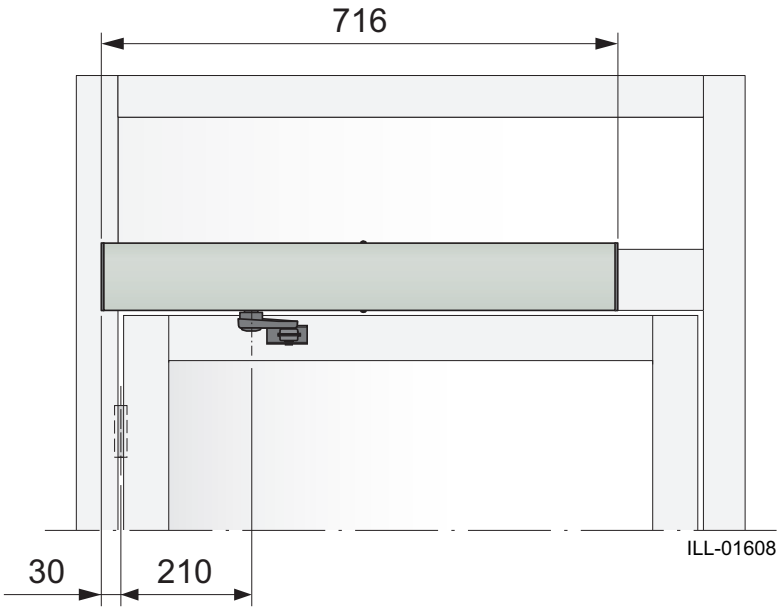
Three main models of the Entrematic EMSW EMO are available:

- EMSW EMO, standard cover
- EMSW EMO-SPEC, cover with optional length
- EMSW EMO-2, double door operators

The operators are non-handed and not dependent on the hinges. The operators suit both pushing and pulling arm systems.

5.1 EMSW EMO, standard cover (wall mounted)

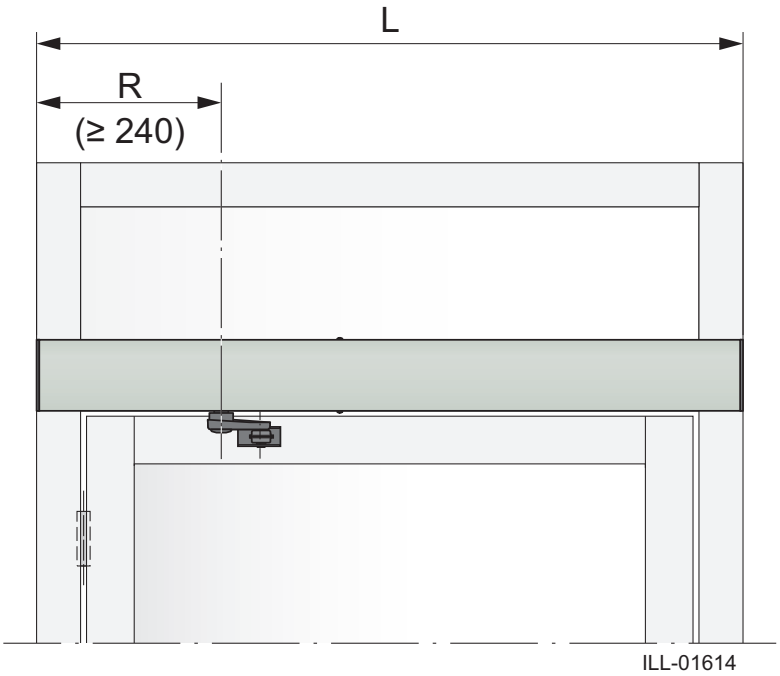
EMSW EMO is the standard operator. Pushing arm system shown. Measurement from hinge centerline to outgoing shaft is always 210 mm regardless if butt or pivot hinged systems.



5.2 EMSW EMO-SPEC, cover with optional length (wall mounted)

The EMSW EMO-SPEC carries a cover with optional length e.g. with the same width as the frame. The cover length L and the measurement R must be specified in the order.

Pushing arm system shown.

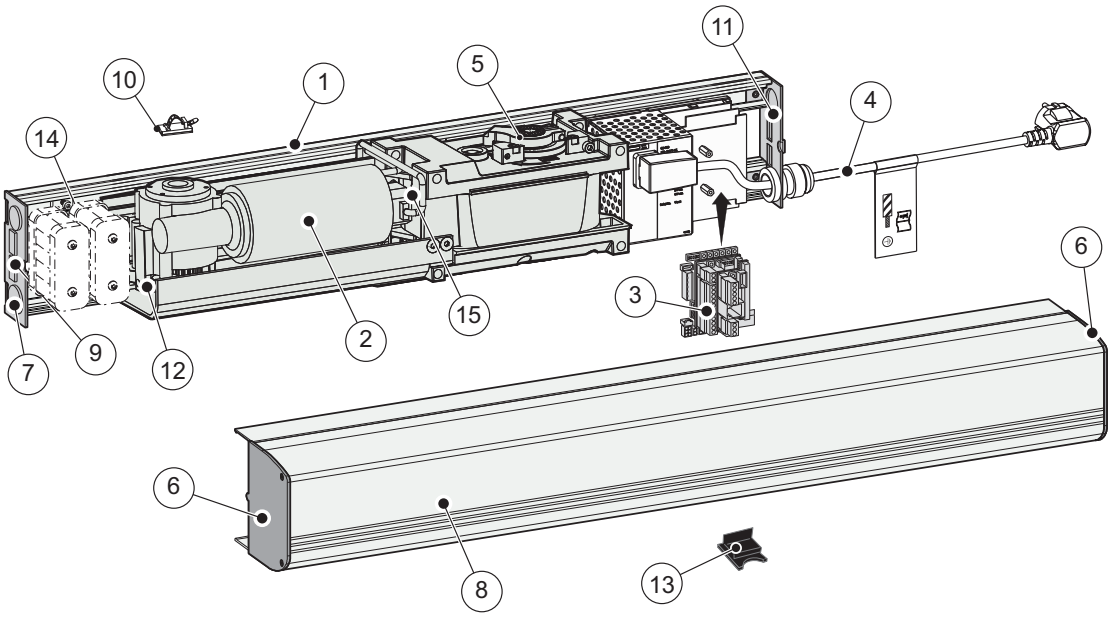


5.3 EMSW EMO-2, double door operators (wall mounted)

The EMSW EMO-2 consists of two operators that are mounted under the same cover to open one door each. The cover length L and the measurements R and S must be specified in the order.

Pushing and pulling arm system shown. It is also possible to use two pushing or two pulling arm systems.

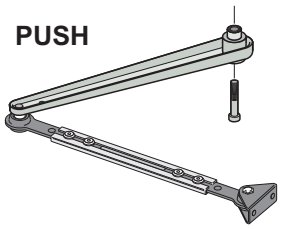
6 Part identification & Accessories



Item No.	Art. No.	Description
1	331004436	Back plate
2	331003498	Transmission unit/operator
3	331003532	Control unit CU-ESD
	331003554	EXU-SI (Kit to extend the security functions) – optional
	331003557	EXU-SA (Kit to extend the safety functions) – optional
4	331006340	Cable kit
5	331003540	Door stop body
6		Top end plate*
7	331003543	Bottom end plate
8	331004998	Cover
9	331003581	Power ON/OFF switch
	331003582	ON/OFF/HOLD open switch – optional
10	331003578	Cable holder (50 pcs)*
11	–	Knockouts for cable inlet
12	–	Belt tension device
13		Fill cover (output shaft)*
14	331003567	Battery backup unit – optional
15	330000233	Encoder cable
–	331003583	Sync cable – optional

* Included in Mounting Kit 331005709

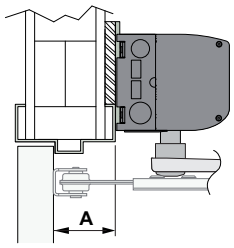
6.1 Arm system, PUSH



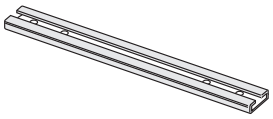
Art.No. 1003576BK
This arm system is delivered with drive arm, telescopic part and door fitting. It is used if the operator is installed on the wall on the opposite side of the door swing, and approved for fire door application.

6.1.1 PUSH-arm extensions

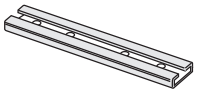
Reveal = A	Extension
0-100 mm	None (standard arm)
100-210 mm	345 mm
210-300 mm	230 mm + Joint part



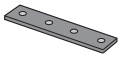
345 mm extension
Art. No. 173005



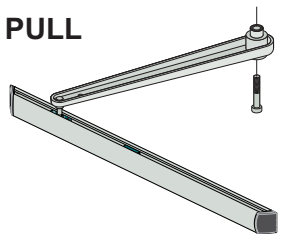
230 mm extension
Art. No. 173004



Joint part
Art. No. 173191

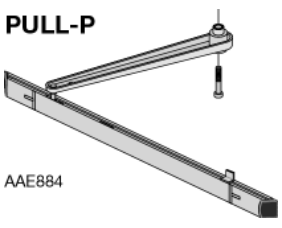


6.2 Arm system, PULL



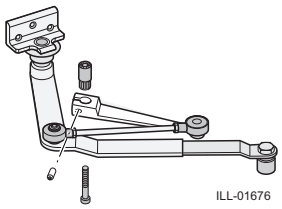
Art. No. 1003577BK
This arm system is delivered with drive arm, guide shoe and door fitting. It is used if the operator is installed on the wall on the same side as the door swing.

6.3 Arm system, PULL-P



Art. No. 1005273BK
This arm system is delivered with drive arm, guide shoe and door fitting with break-out unit.
It is used if the operator is installed on the wall on the same side as the door swing and break-out unit is required.

6.4 Arm system, ST-V / ST-H



Art. No. ST-V 172313
Art. No. ST-H 172315

This arm system is delivered with drive arm and guide roller.

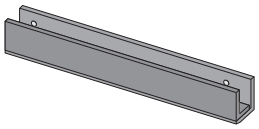
Note! Door fitting not included.

It is used if the operator is installed on the wall on the same side as the door swing and break-out unit is required.

6.4.1 Options for ST-V / ST-H

Door fitting standard

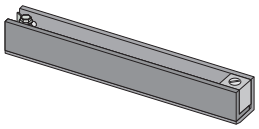
Art. No.: 172071



Door fitting Break-out (pivot doors)

Art. No. 172325, **right,** reveal A = 0-60 mm or **left** when A > 60-100 mm

Art. No. 172327, **right,** reveal A > 60-100 mm or **left** when A = 0-60 mm



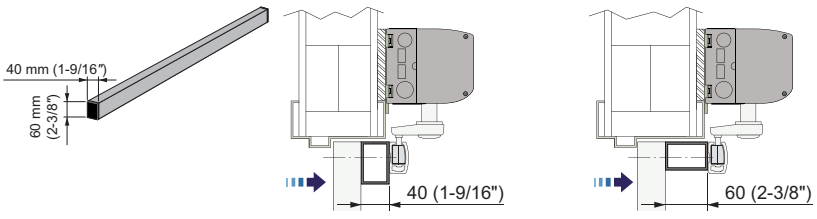
Arm extension

Art. No. 172320 required when the reveal A >60-100 mm

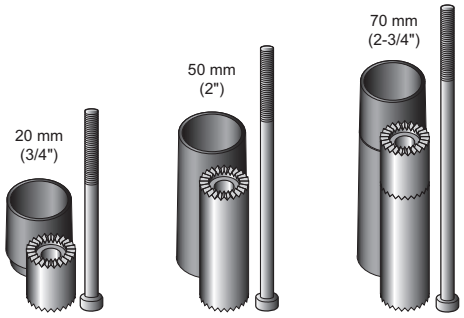
6.5 Reveal spacer: PULL / PULL-P

Art. No. PULL 173804BK

Art. No. PULL-P 173831BK



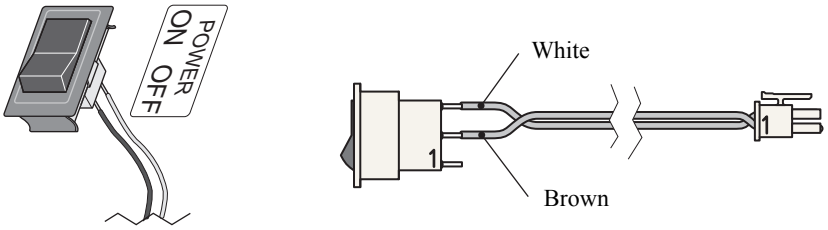
6.6 Drive shaft extension kits



Art. No. 173107 | Art. No. 173108 | Art. No. 173109

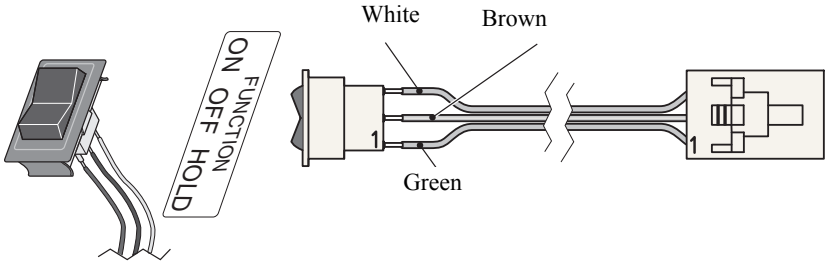
6.7 Control switches

6.7.1 Power ON/OFF switch



P/N: 1003581

6.7.2 ON/OFF/HOLD open switch (will not operate electric lock)



P/N: 1003582

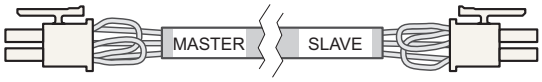
Function	Program
ON	Impulses from activation units connected to XIMP are forwarded into inner impulse “CU-ESD” on page 48.
OFF	Impulses from activation units connected to XIMP are **not** forwarded into inner impulse. These units cannot open the door.
HOLD	The door is held permanently open.

6.7.3 4-position switch PS-4C (operates the electric lock)

Art. No 655845

Position		Function
	OFF	The door is closed. The door cannot be opened with inner and outer activation units. The door is locked if an electromechanical locking device has been fitted. The door can be opened with a key switch (if fitted).
	EXIT	Passage from inside only. The door is normally locked if an electromechanical locking device has been fitted. The door can only be opened with the inner activation unit and with a key switch (if fitted).
	AUTO Normal position	The door can be opened with the inner and outer manual and/or automatic activators. The electric strike, if fitted, is open.
	OPEN	The door is held permanently open by the motor.

6.8 Sync cable for double doors (synchronizing of 2 operators)

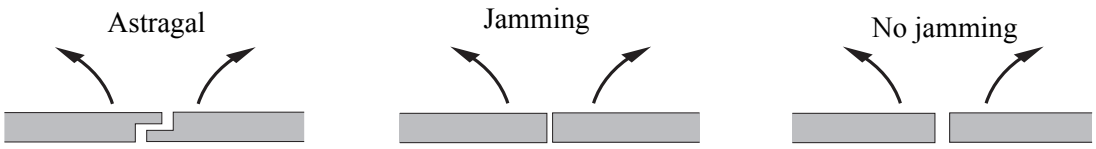


Note! The connection/marking of the sync cable determines which of the operators is the MASTER and SLAVE

Art. No. 1003583

How to cut the jumper for double doors

Function		Door design		Cut the jumper with color	
Opening	**Closing**	**Astragal**	**Jamming**	**MASTER side**	**SLAVE side**
Synchronous	Synchronous	No	No	No cutting	No cutting
Synchronous	Asynchronous	Yes	No	Cut black	No cutting
Asynchronous	Asynchronous	Yes	Yes	No cutting	Cut red
Double egress		—	—	Cut black	Cut red



Settings for double doors

Function	Settings on the	
	MASTER	SLAVE
Common		
Program selection	X	
Opening time	X	
Closing time	X	
Hold open time	X	
Close / Continue to open when the door is obstructed	X	
PAG On/Off	X	
Level of Power assist	X	(X)*
Extended closing force	X	(X)*
OPD Impulse or Mat Logic Impulse	X	
Selection of operating mode during operation on battery power	X	
Individual		
Lock/Unlock signal voltage	X	X
Locked without/with power	X	X
Lock release Enable/Disable	X	X
Open Delay Time	X	X
Lock kick Enable/Disable	X	X

* For “Double egress doors”, these functions must be set separately for MASTER and SLAVE as the arm systems as well as the air pressure may be different.

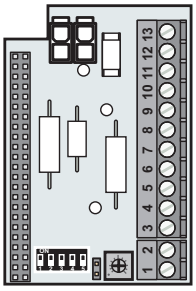
Note!

- Locks on the MASTER and SLAVE doors must be connected to the control unit (CU) on the corresponding operator.
- Inner and outer impulses can be connected to either MASTER or SLAVE CU or both.
- The OPD is to be connected to the MASTER CU except for “Double egress”, where each OPD must be connected to corresponding CU.
- Door leaf mounted sensors must always be connected to corresponding CU.
- The slave door can be prevented to open, if kill is activated on the SLAVE control unit.

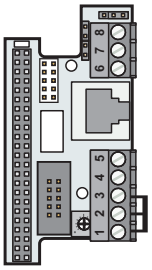
6.9 Extension units

For installation see page 49.

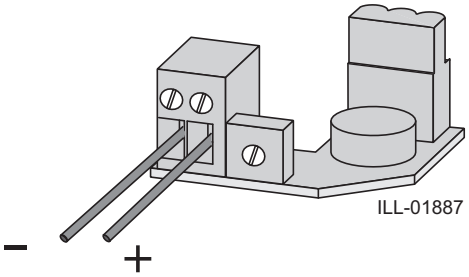
EXU-SI (kit for security functions)
Art. No. 1003554



EXU-SA (kit for safety functions)
Art. No. 1003557

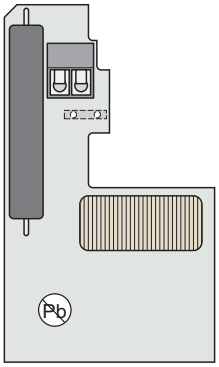


AIU (Audible warning signal)
Art. No. 656083

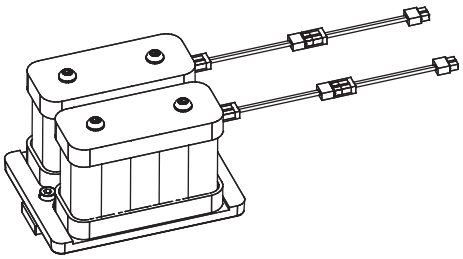


24 V DC

MUL (for multi-strikes)
Art. No. 1005736



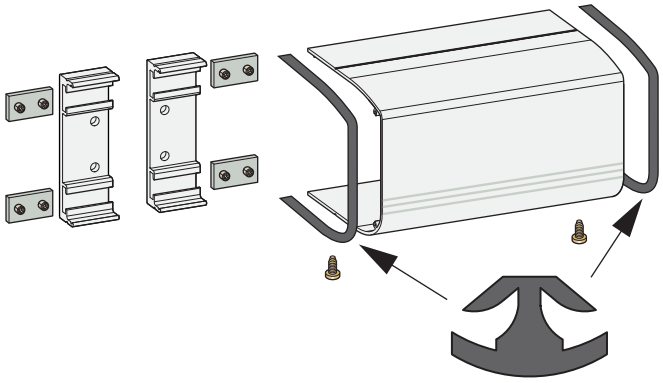
6.10 Battery backup unit



Art. No. 1003567

6.11 Middle piece kit

Art. no 1008383



6.12 Labels

Label kit - including all below

Art. No. 1005227

Emergency break-out, DIN right door
Art. No. 1001785

Emergency break-out, DIN left door
Art. No. 1001786

Activation by disabled people
Art. No. 1003963

Operator designed for disabled people
Art. No. 1003964

Supervision of child
Art. No. 1001695

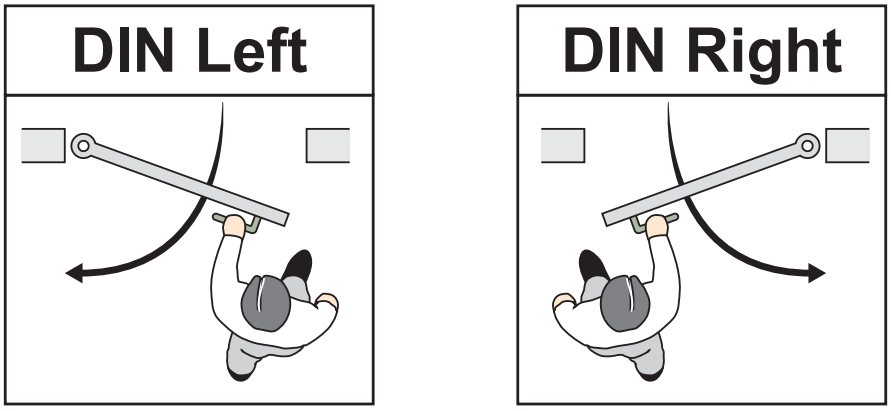
7 Pre-installation

7.1 General tips/Safety concerns

- For enhanced security and vandalism protection, always mount the operator access in the interior of a building whenever possible.
- Make sure that the power is off before installing.
- Make sure that the door leaf and the wall are properly reinforced at the installation points.
- Inspect the door hinges before installation to ensure that they are in good repair.
- Unpack the operator and make sure that all parts are delivered in accordance with the packing note.

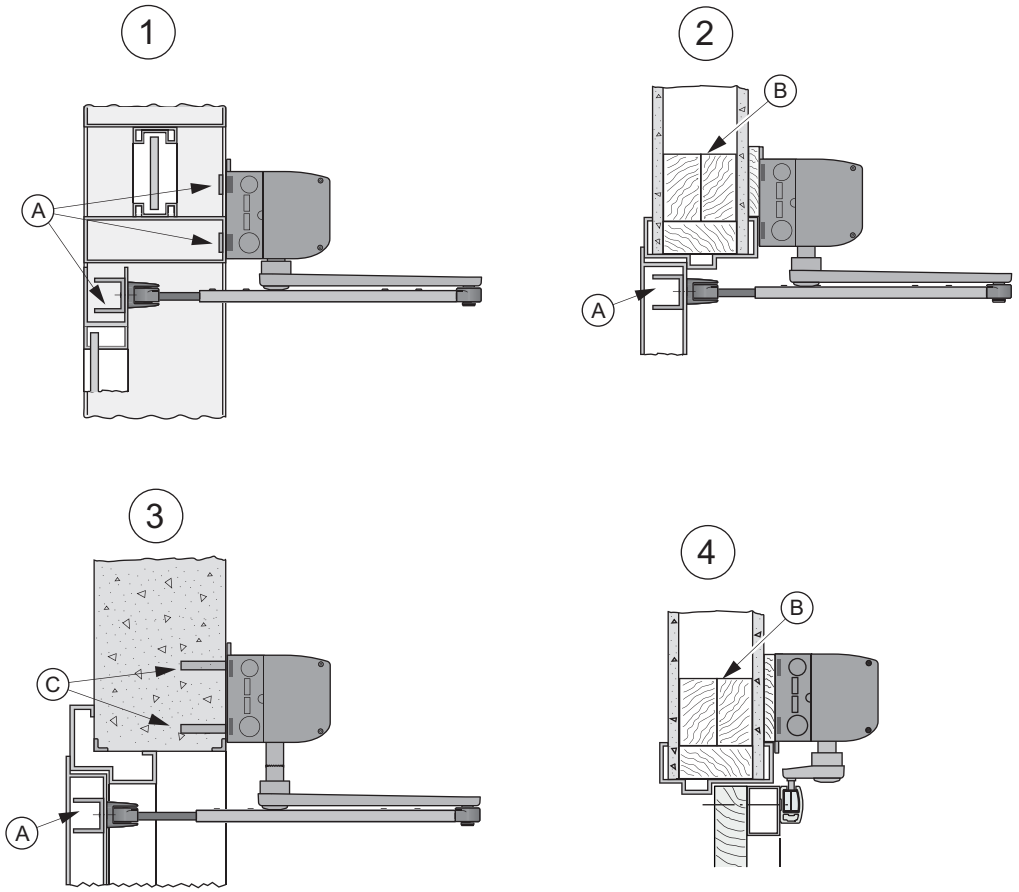
7.2 Operator/Door handing

Operator/Door handing (DIN Right or DIN Left) is determined by which side the hinges are mounted seen from the swing side.



ILL-01625

7.3 Installation examples



1	Aluminium profile system	A	Steel reinforcement or rivnut
2	Plasterboard wall	B	Wood reinforcement
3	Reinforced concrete wall and brick wall	C	Expansion-shell bolt (for brick wall min. M6x85, UPAT PSEA B10/25)
4	Plasterboard wall		

7.4 Fastening requirements

Base material	Minimum requirements of wall profile*
Steel	5 mm**
Aluminium	6 mm**
Reinforced concrete	min. 50 mm from the underside
Wood	50 mm
Brick wall	Expansion-shell bolt, min. M6x85, UPAT PSEA B10/25, min. 50 mm from the underside

* Entrematic minimum recommended requirements. Building Codes may give different specifications. Refer to AHJ (Authority Having Jurisdiction).

** Thinner wall profiles must be reinforced with rivnuts.

7.5 Tools required

- Torx T10
- Metric Allen wrenches 2,5; 3; 4 and 6 mm
- Flatblade screwdriver (potentiometer and terminal size)
- Screwdriver (Philips size 2)
- Nut driver, 5 mm
- Carpenter’s level
- Tape rule
- Power drill and set of drill bits
- Center punch
- Wire stripper
- Silicone sealant
- Installation and Service Manual (this manual)

7.6 Installation on double doors

If the operators are to be mounted at the same height with pushing and pulling arm systems, the height is determined by the pulling arm system, PULL. The pushing arm system PUSH must always have a shaft extension, minimum 50 mm, maximum 70 mm to match the mounting heights visually.

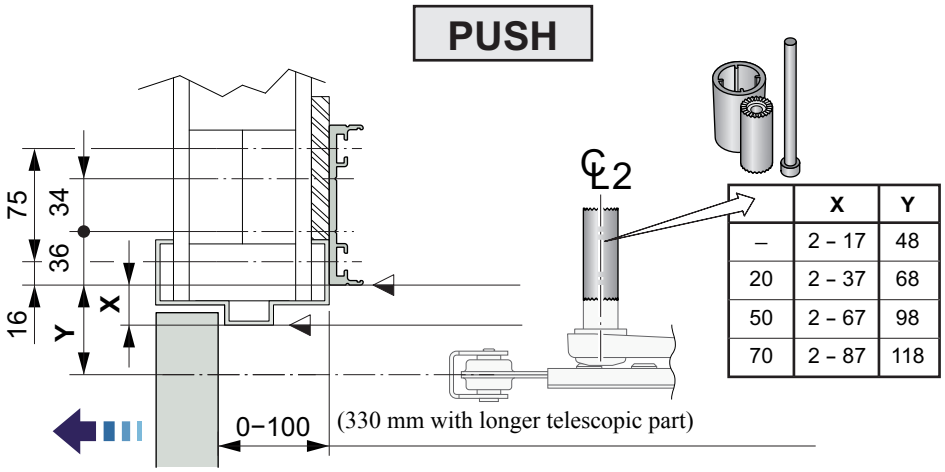
Example: if PULL has a 20 mm extension, the PUSH must have a 70 mm extension. If PULL has 0 mm extension, the PUSH must have a 50 mm extension.

For installation, follow the instructions for the applicable arm system.

8 Mechanical installation

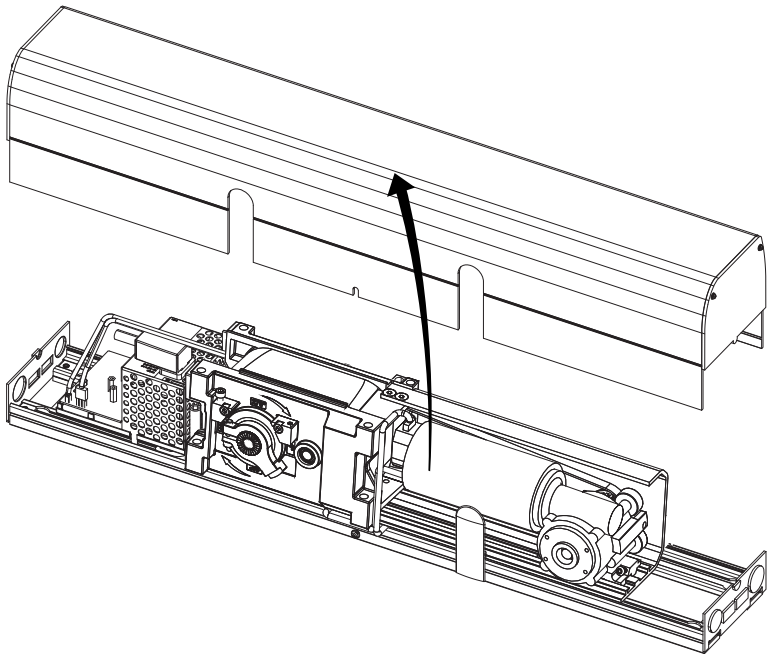
Note! Consider all power wire entry locations and signaling wires before preparing back plate.

8.1 Operator with PUSH arm system

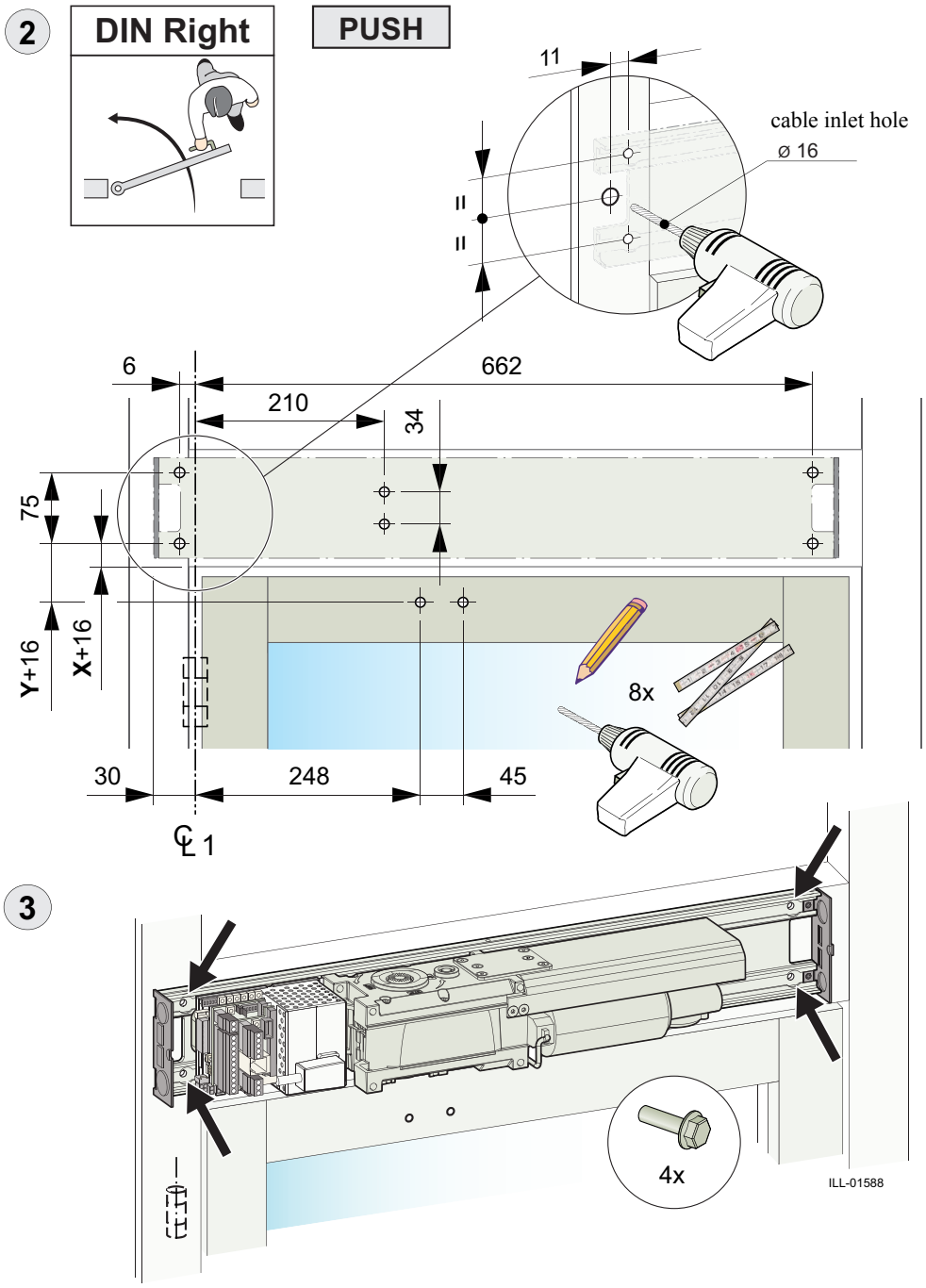


	X	Y
–	2 – 17	48
20	2 – 37	68
50	2 – 67	98
70	2 – 87	118

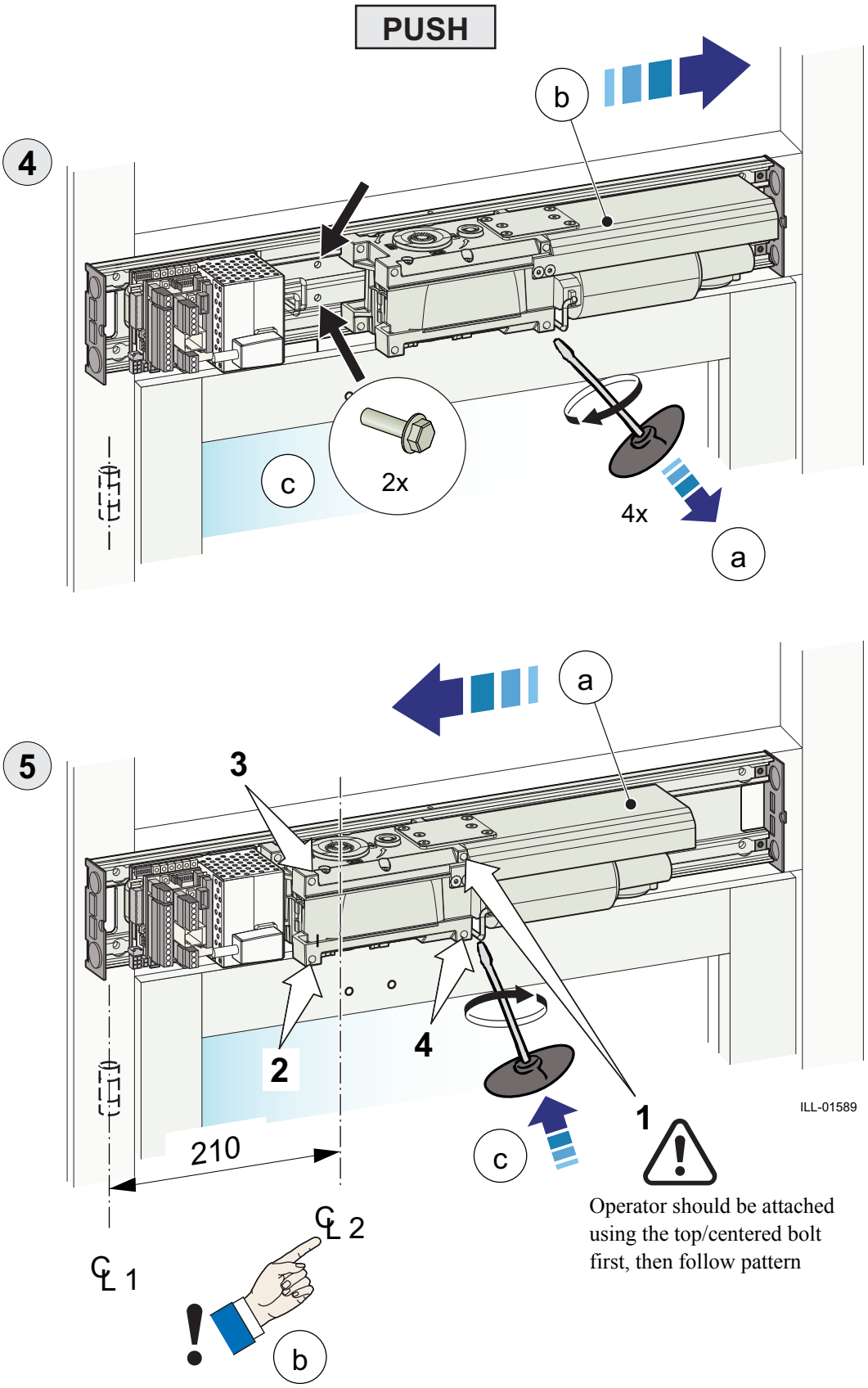
1



Cont. "Operator with PUSH arm system"

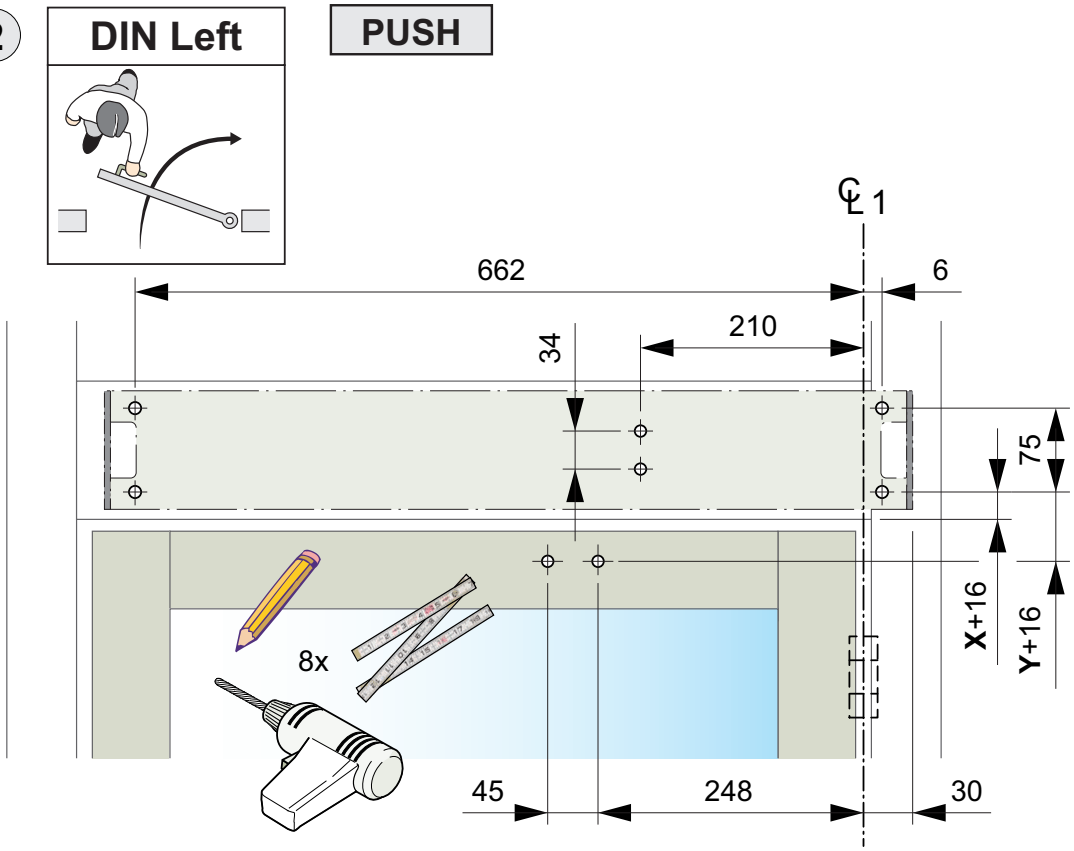


Cont."Operator with PUSH arm system"

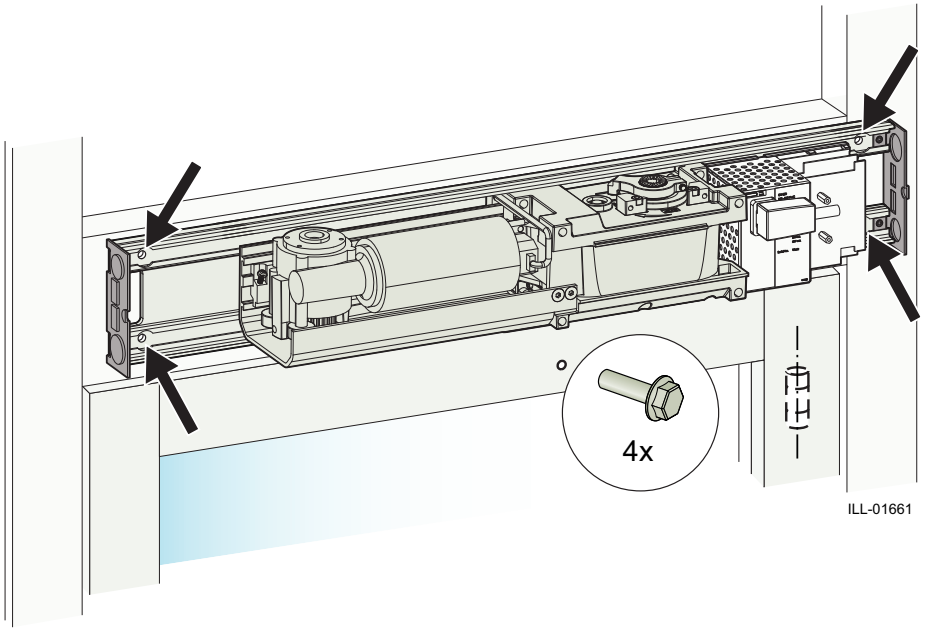


Cont."Operator with PUSH arm system"

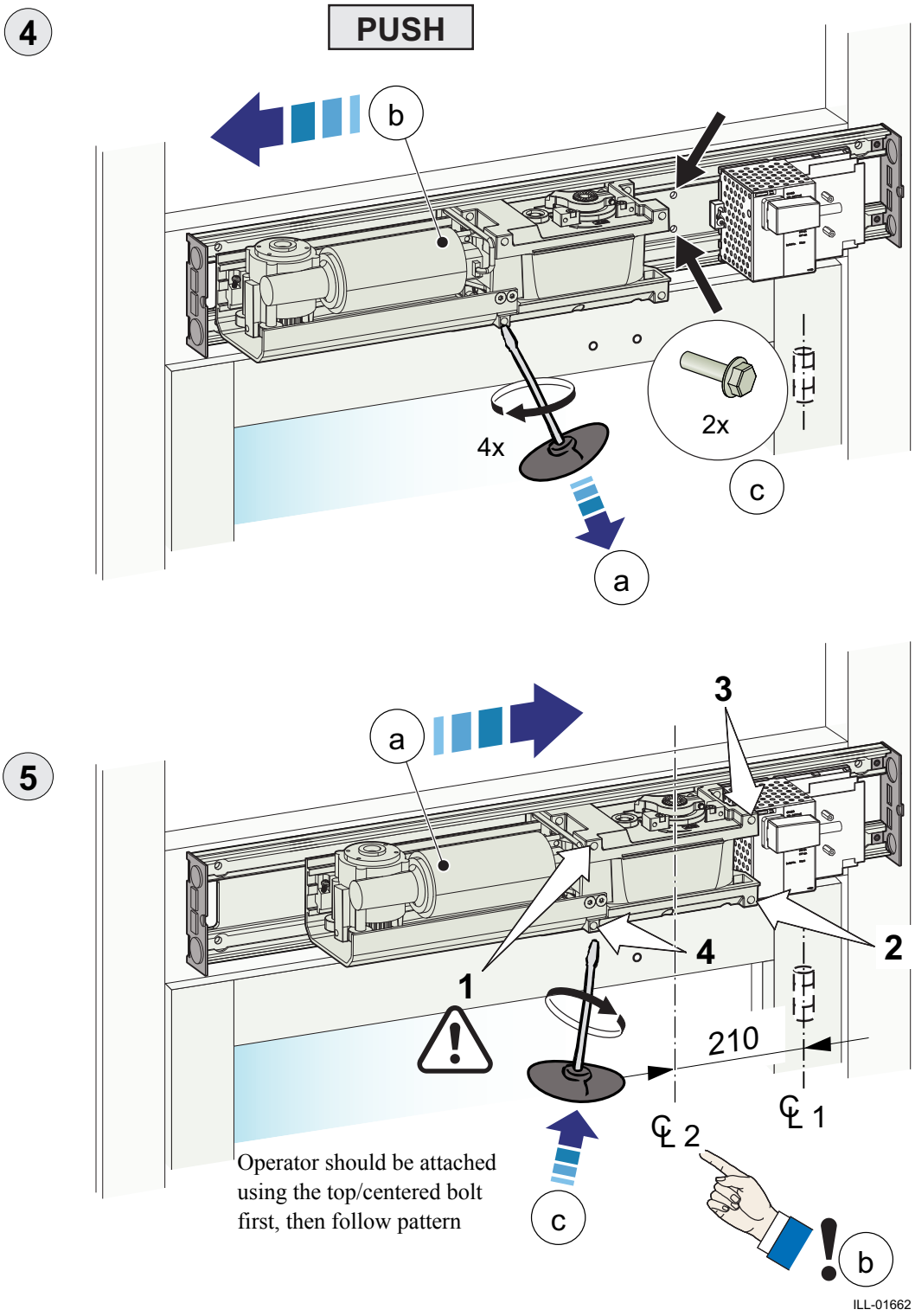
2



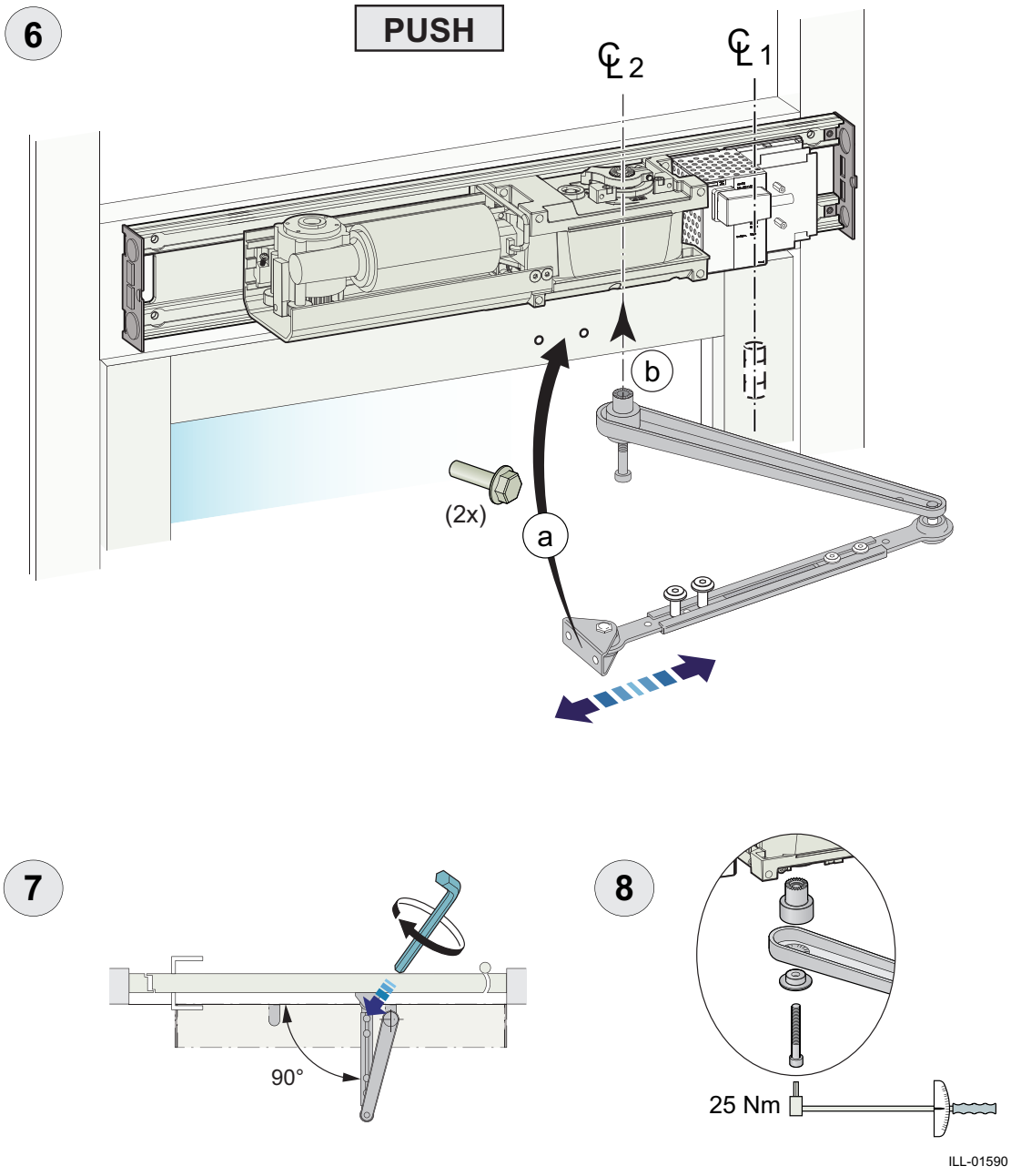
3



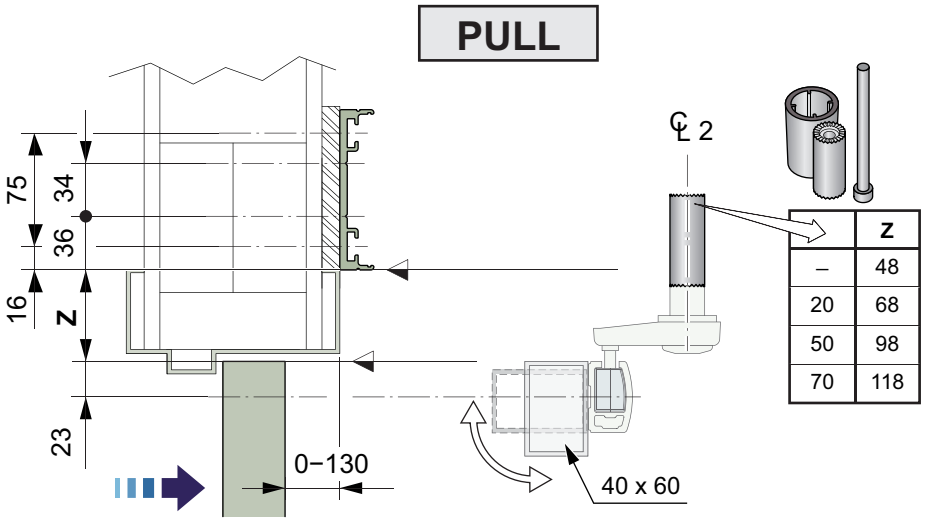
Cont."Operator with PUSH arm system"



Cont."Operator with PUSH arm system"

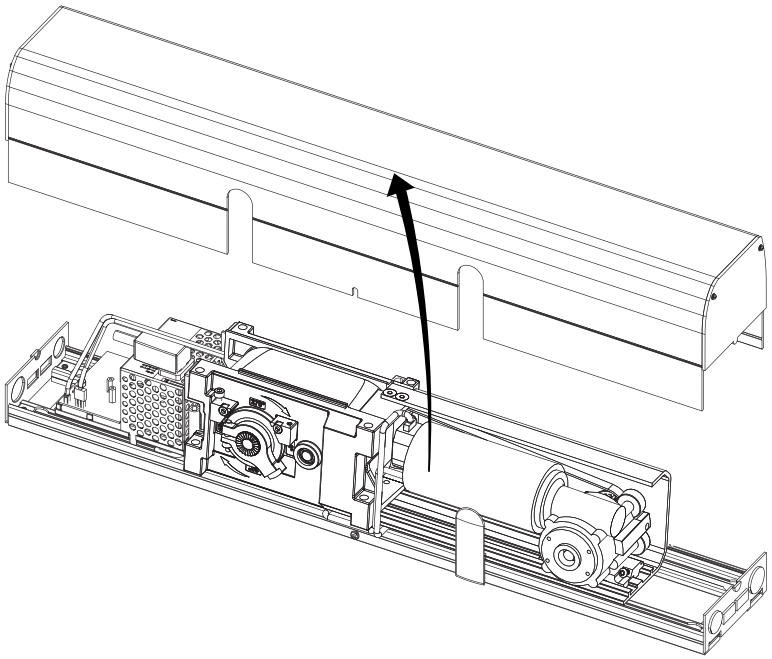


8.2 Operator with PULL arm system

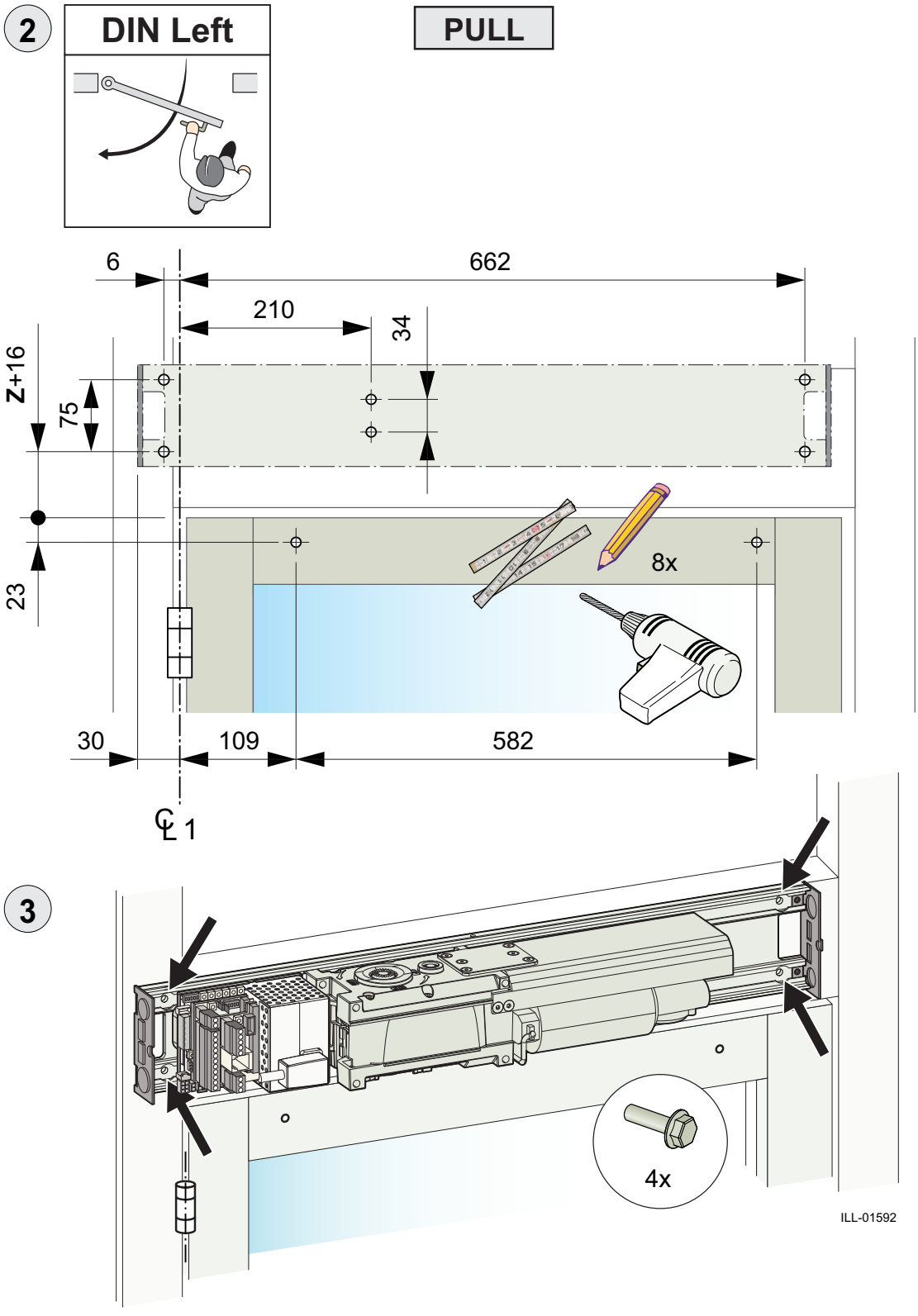


	z
–	48
20	68
50	98
70	118

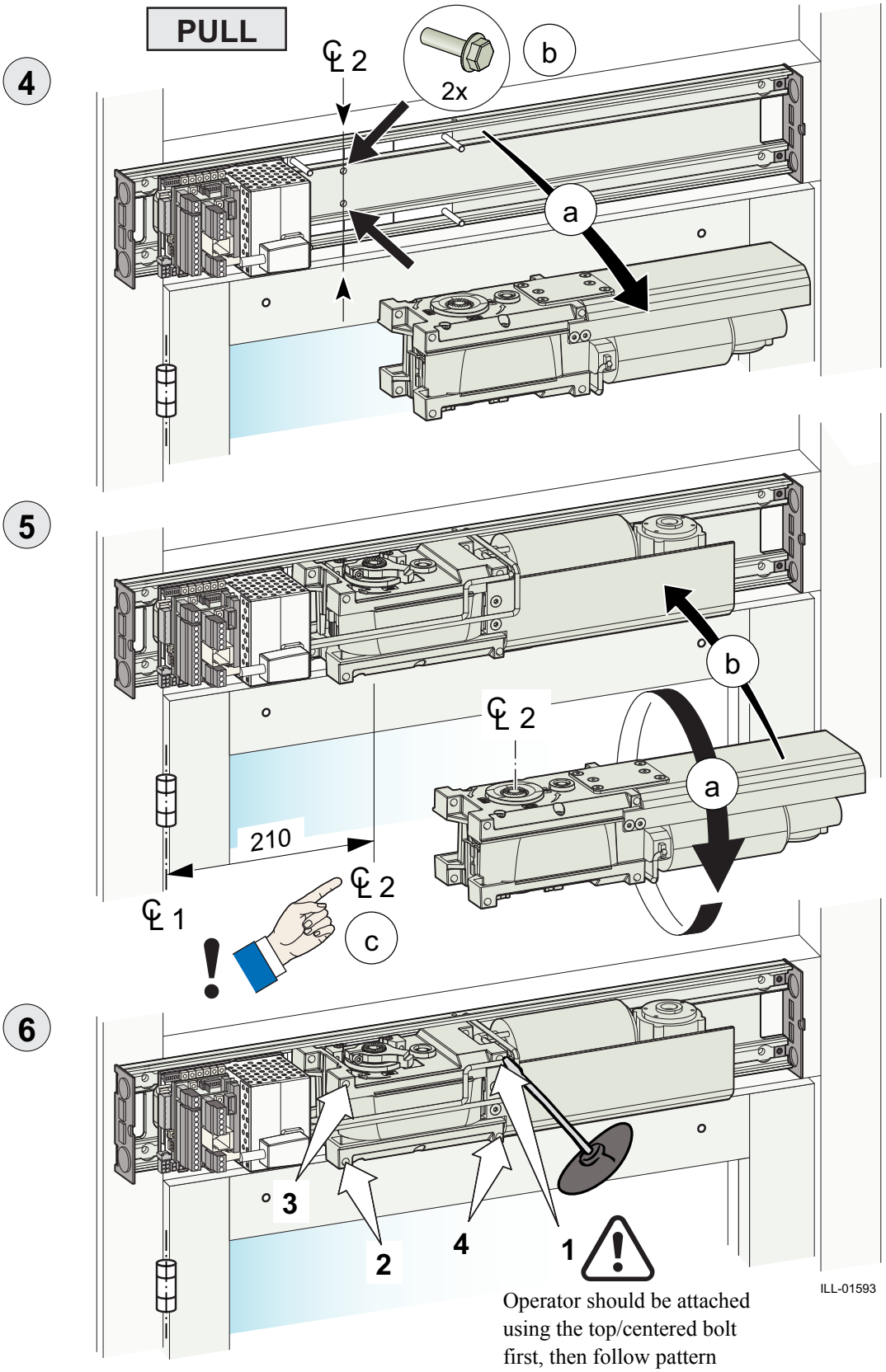
1



Cont. "Operator with PULL arm system"



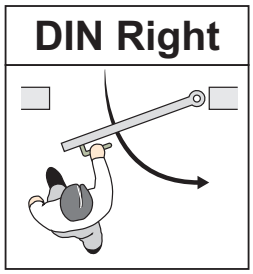
Cont. "Operator with PULL arm system"



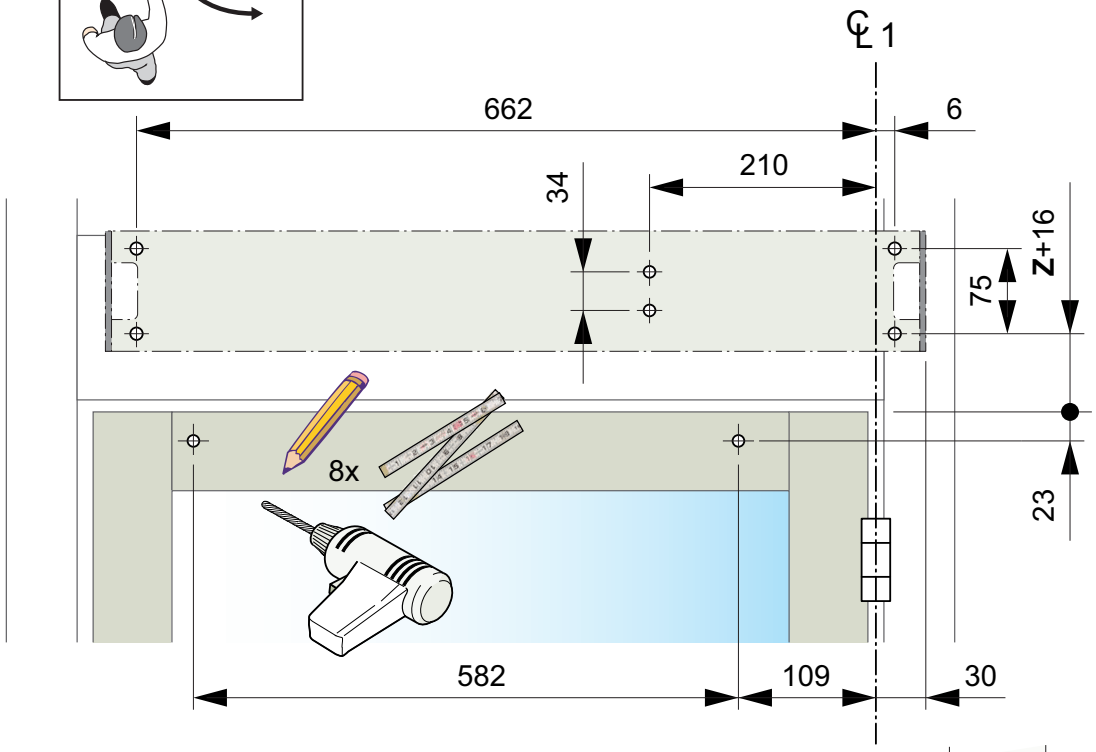
Operator should be attached using the top/centered bolt first, then follow pattern

Cont. "Operator with PULL arm system"

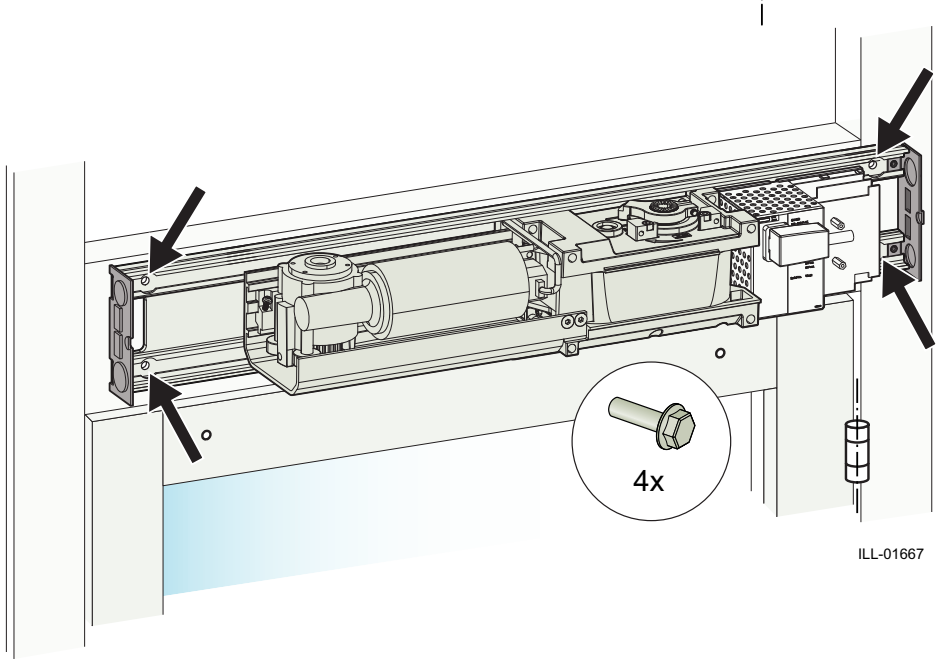
2



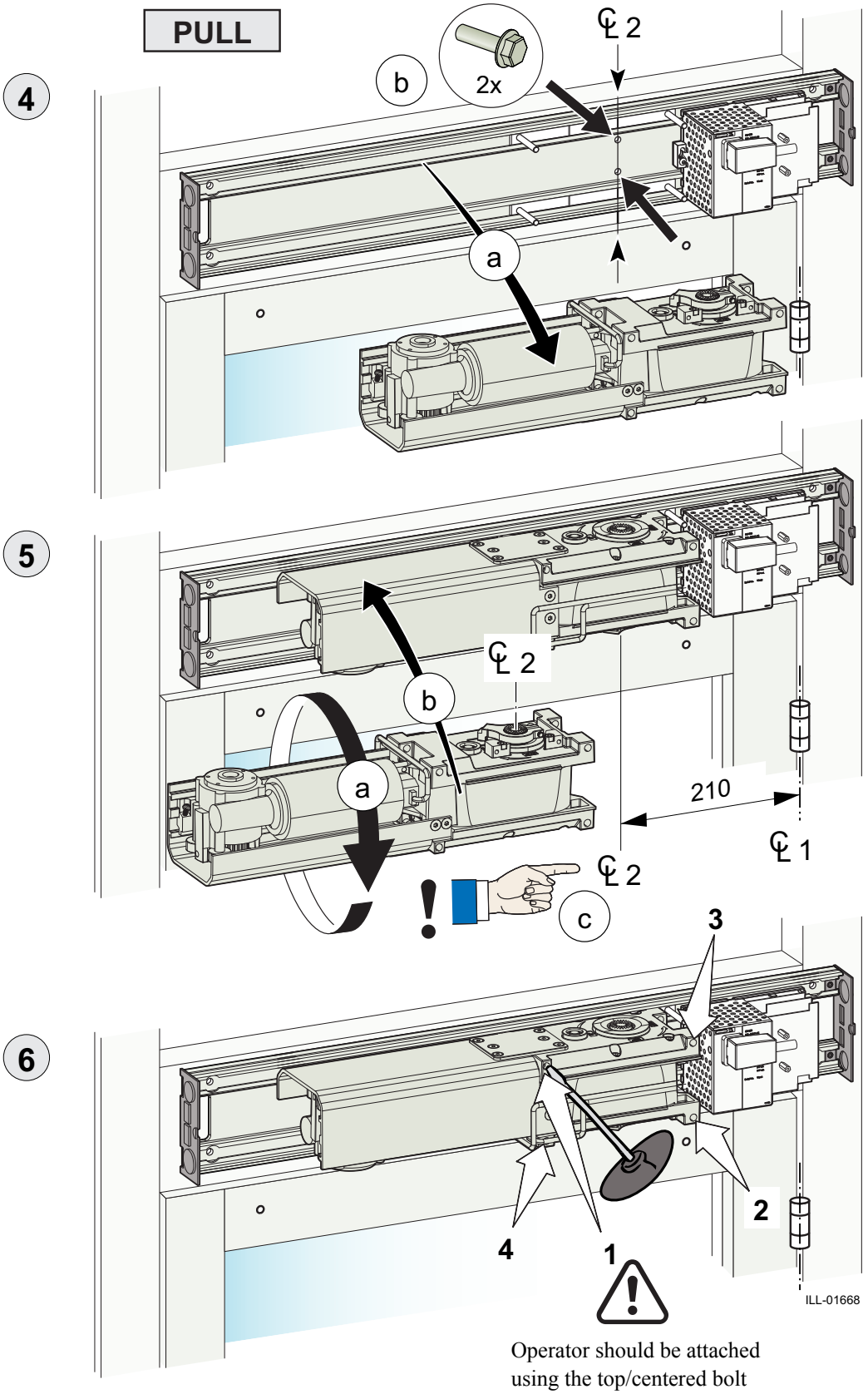
PULL



3

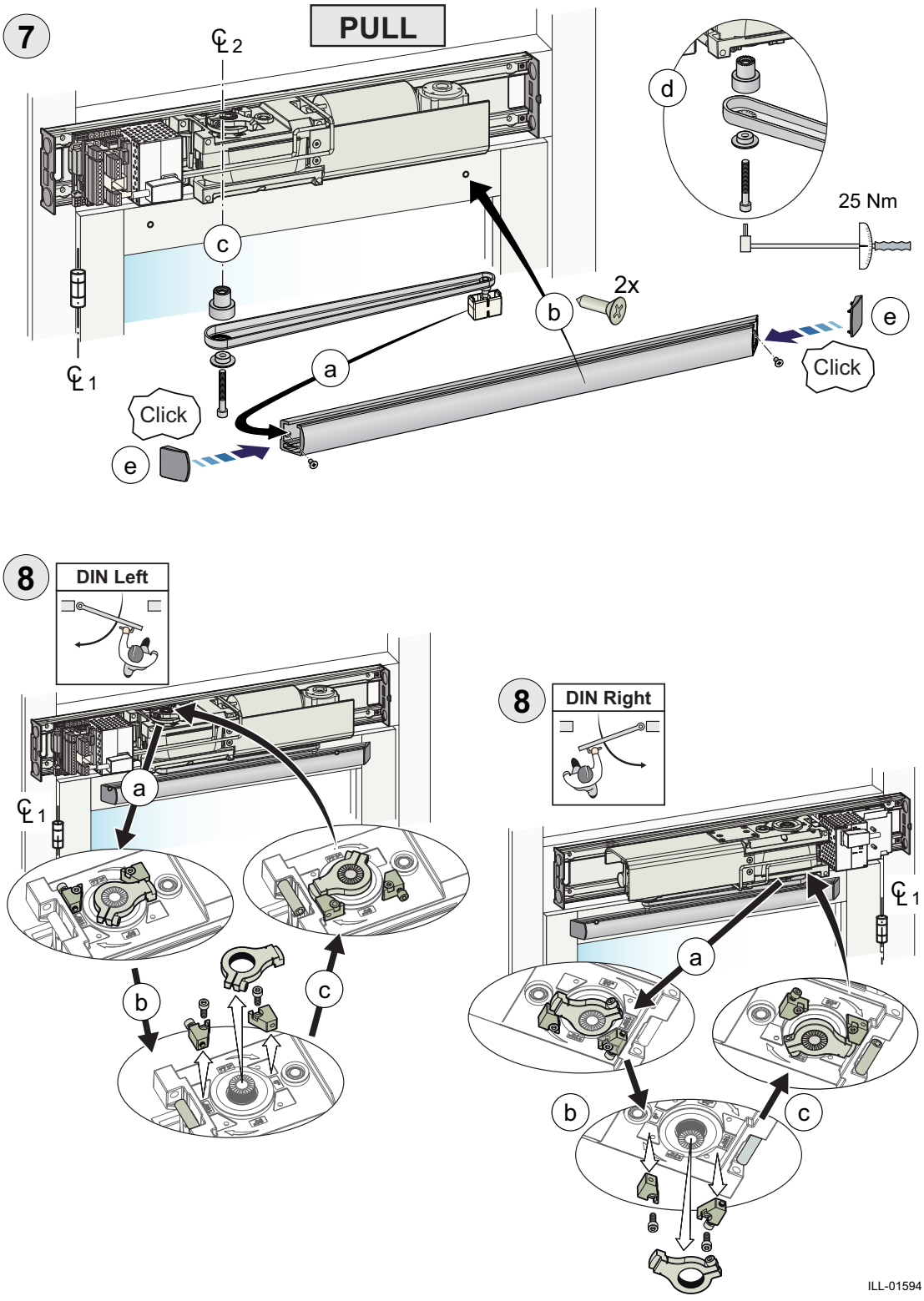


Cont. "Operator with PULL arm system"

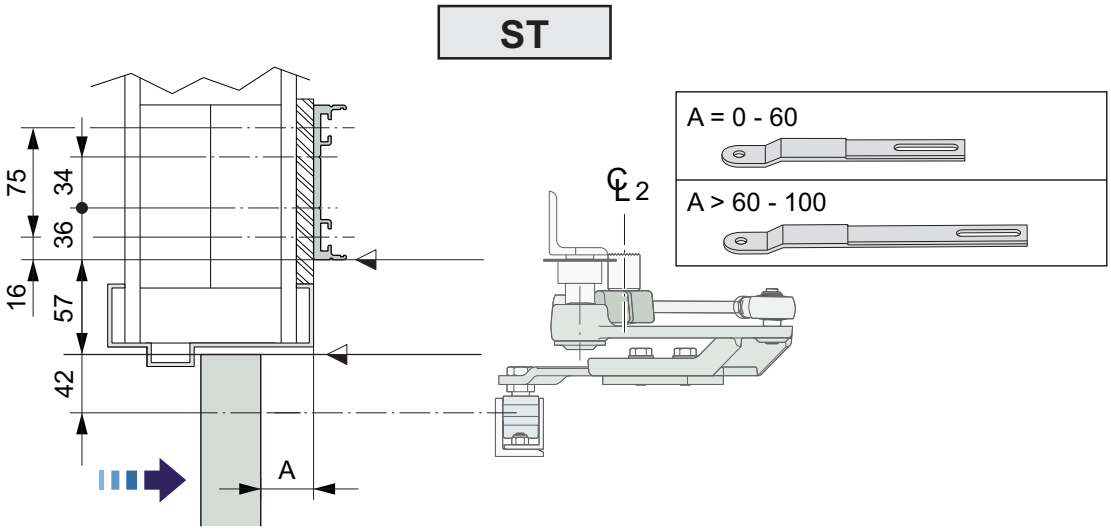


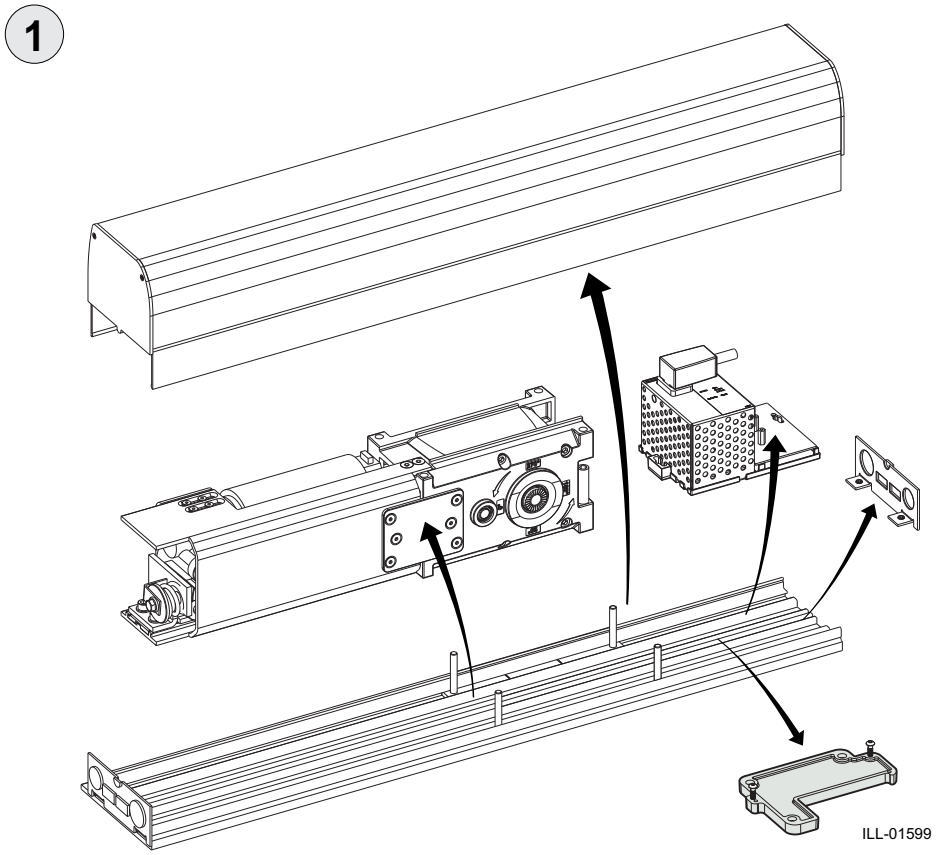
Operator should be attached using the top/centered bolt first, then follow pattern

Cont. "Operator with PULL arm system"

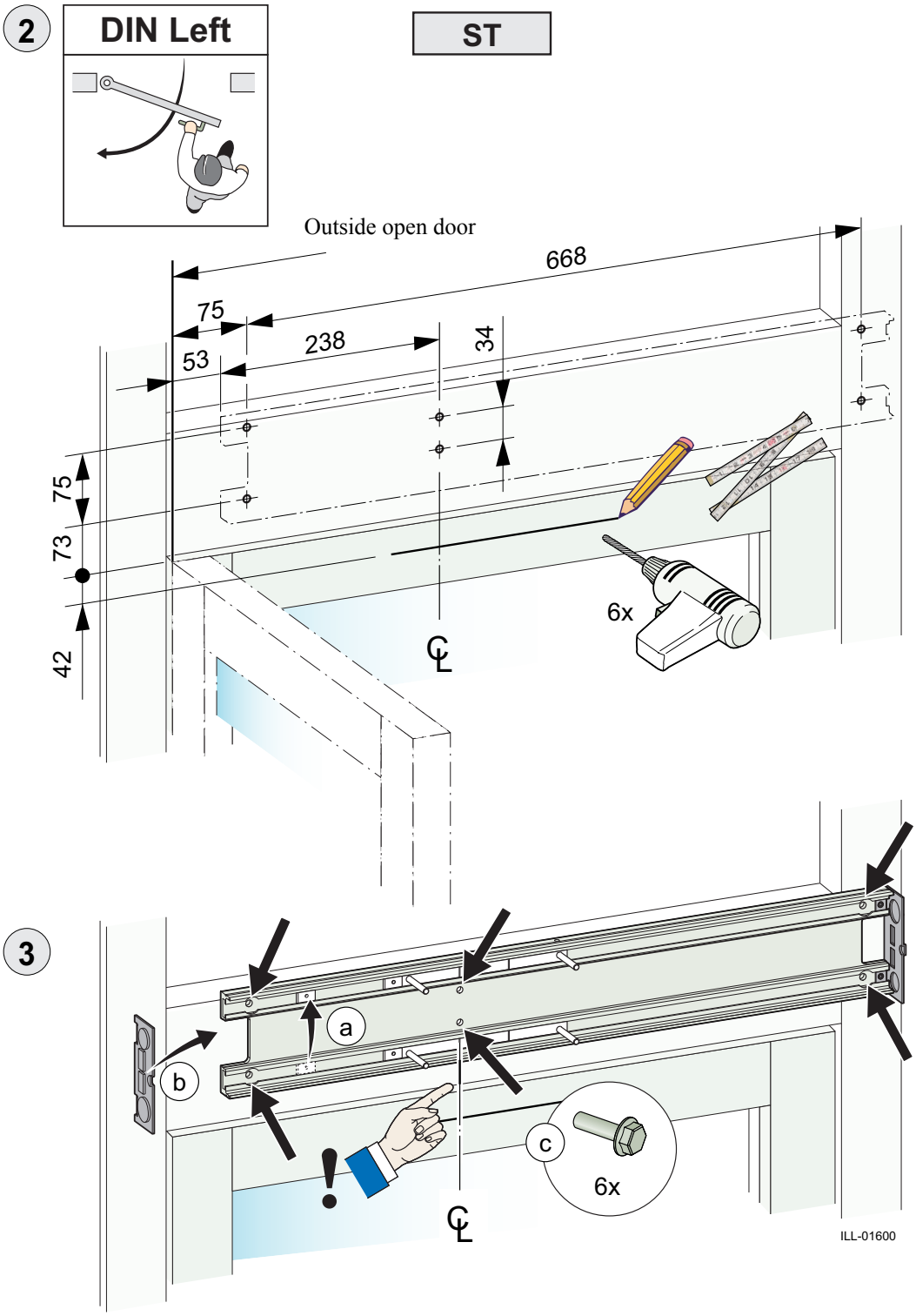


8.3 Installation of operator with arm system ST

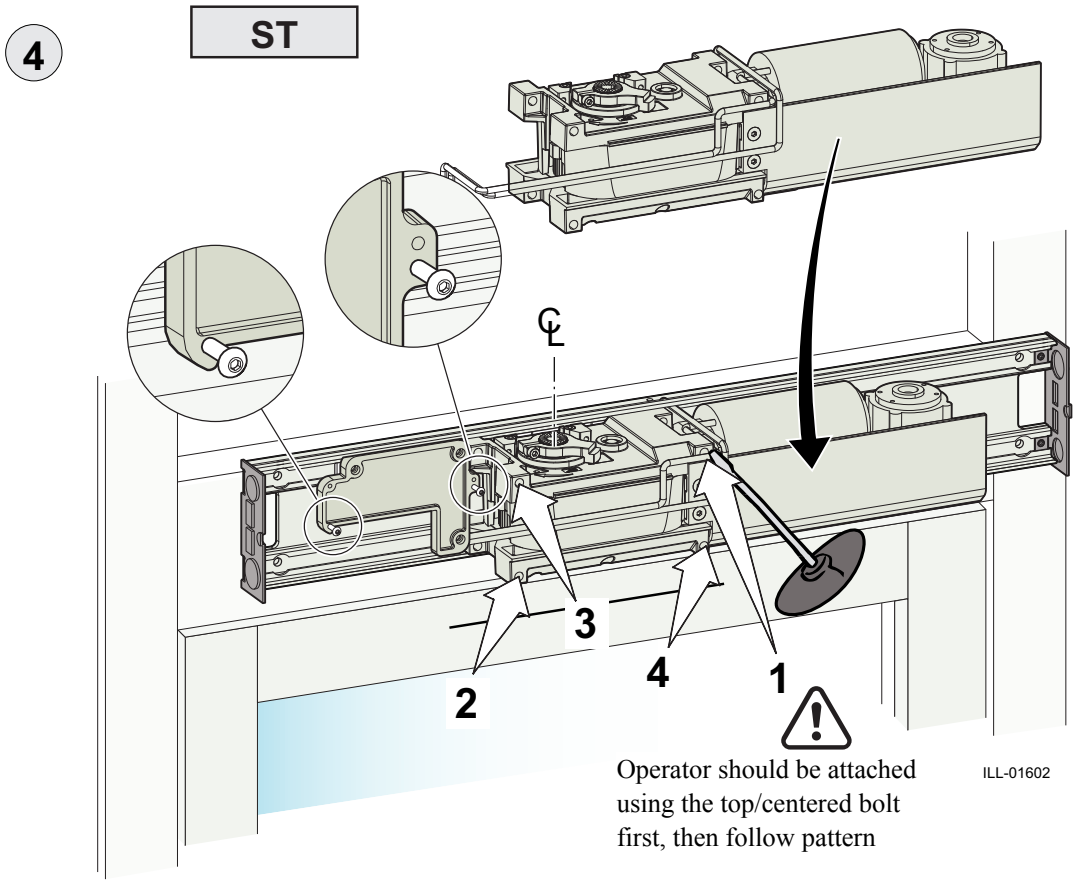




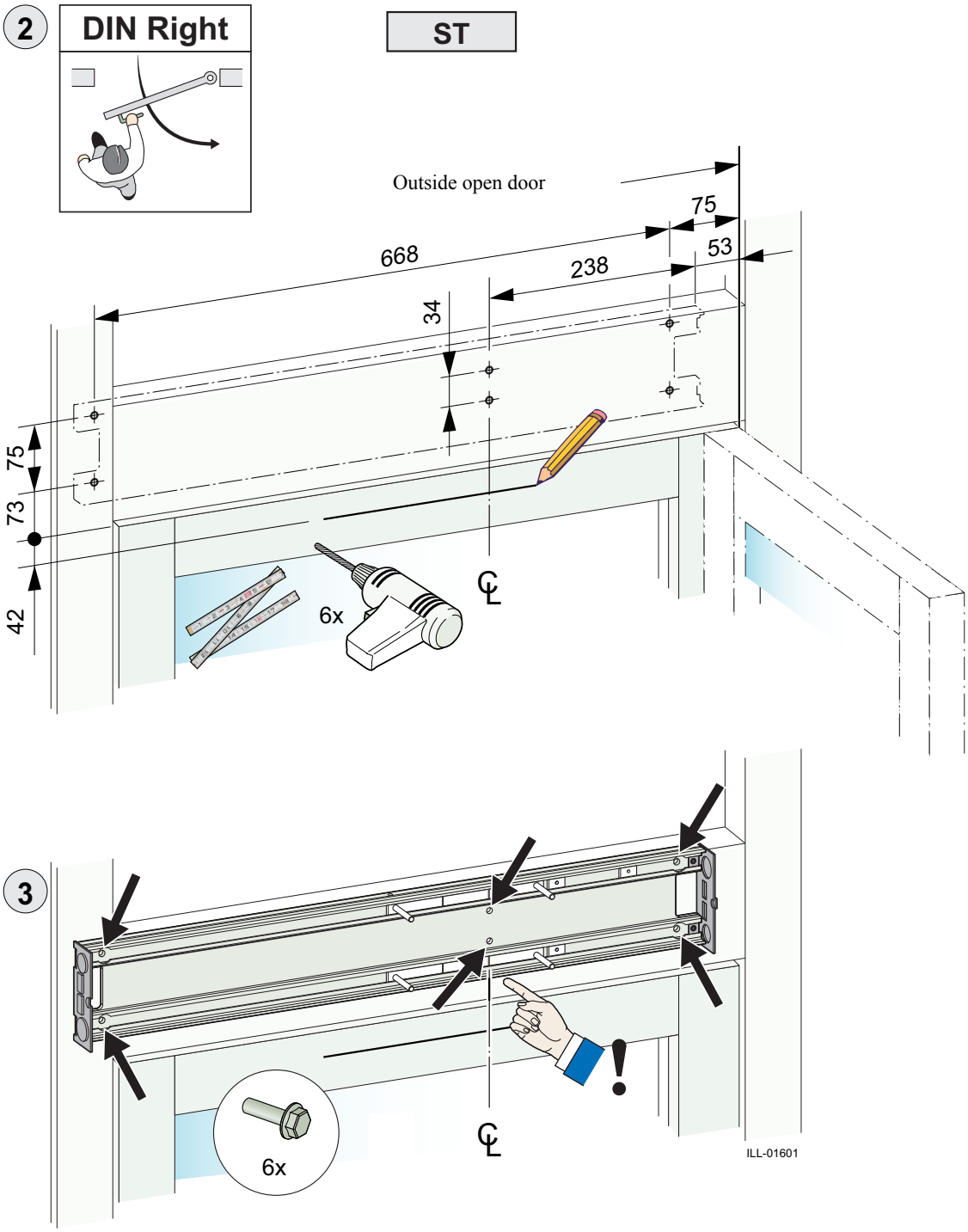
Cont. "Installation of operator with arm system ST"



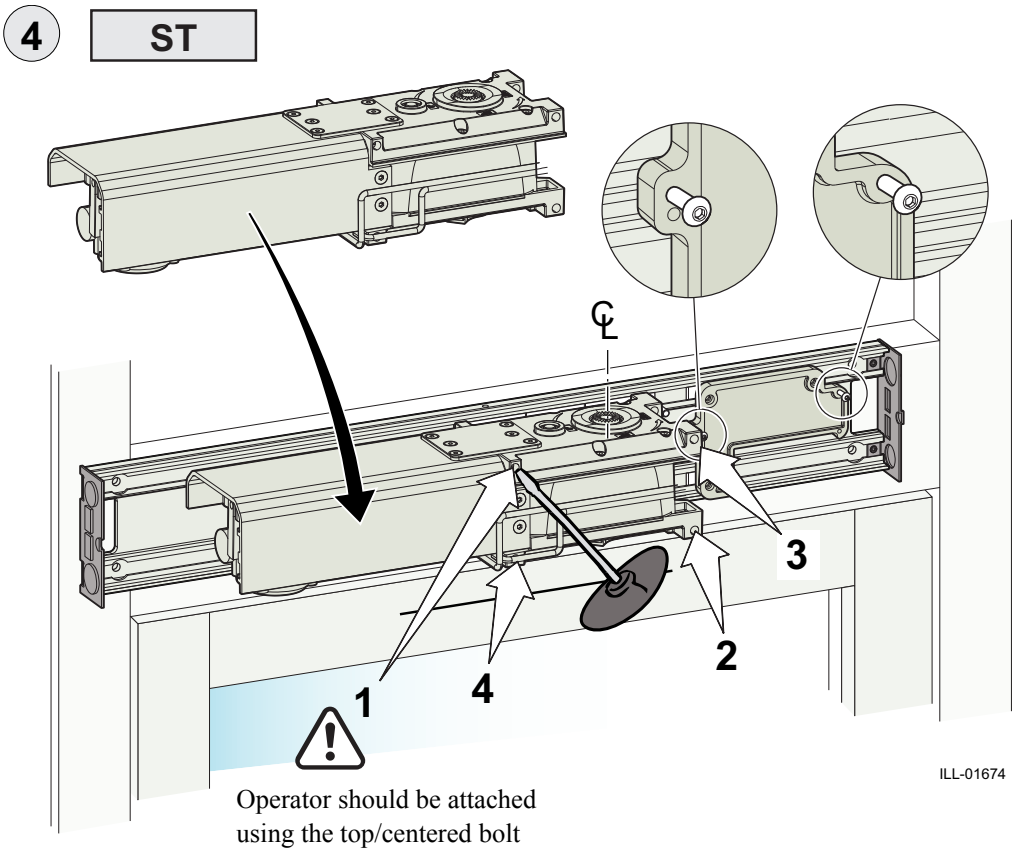
Cont. "Installation of operator with arm system ST"



Cont. "Installation of operator with arm system ST"



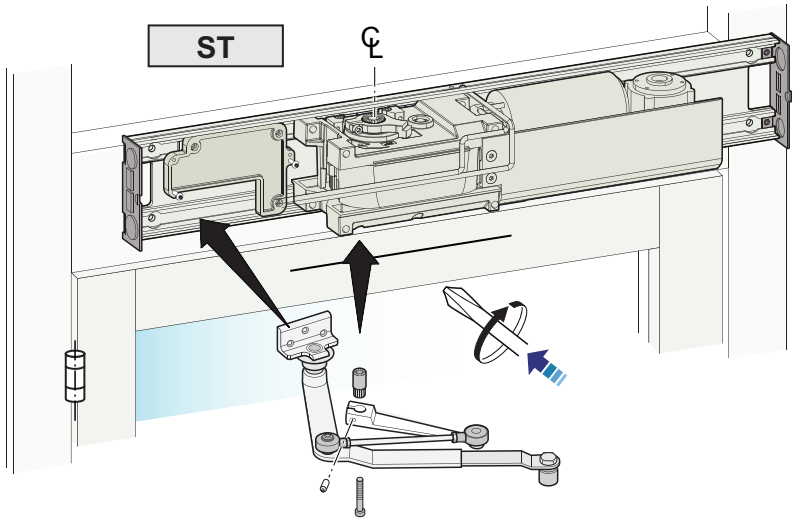
Cont. "Installation of operator with arm system ST"



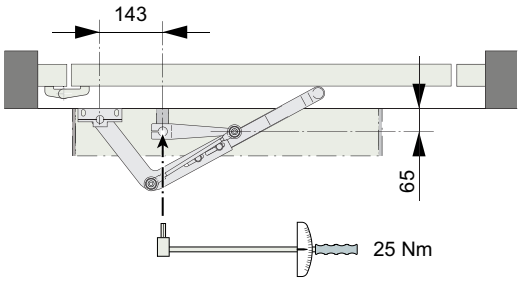
Operator should be attached using the top/centered bolt first, then follow pattern

Cont. "Installation of operator with arm system ST"

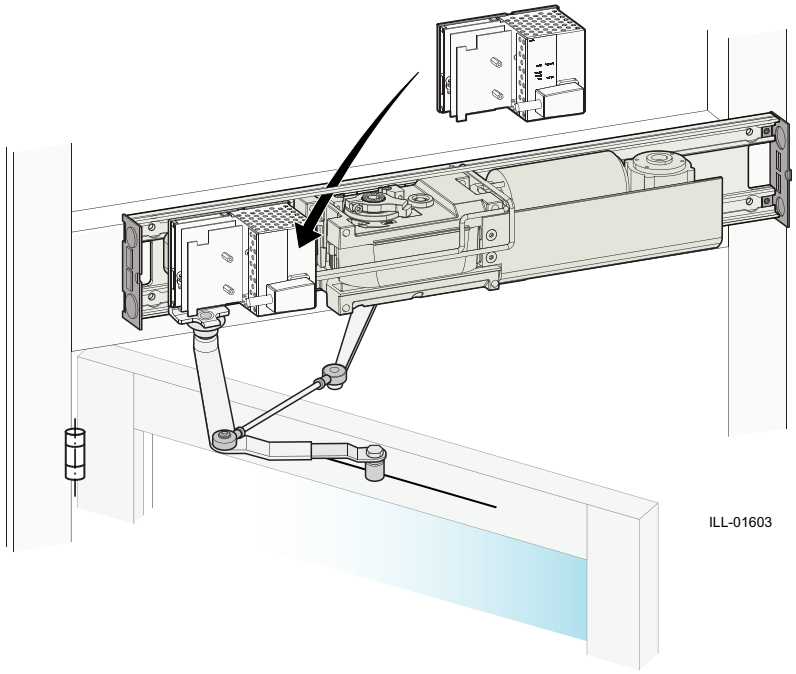
5



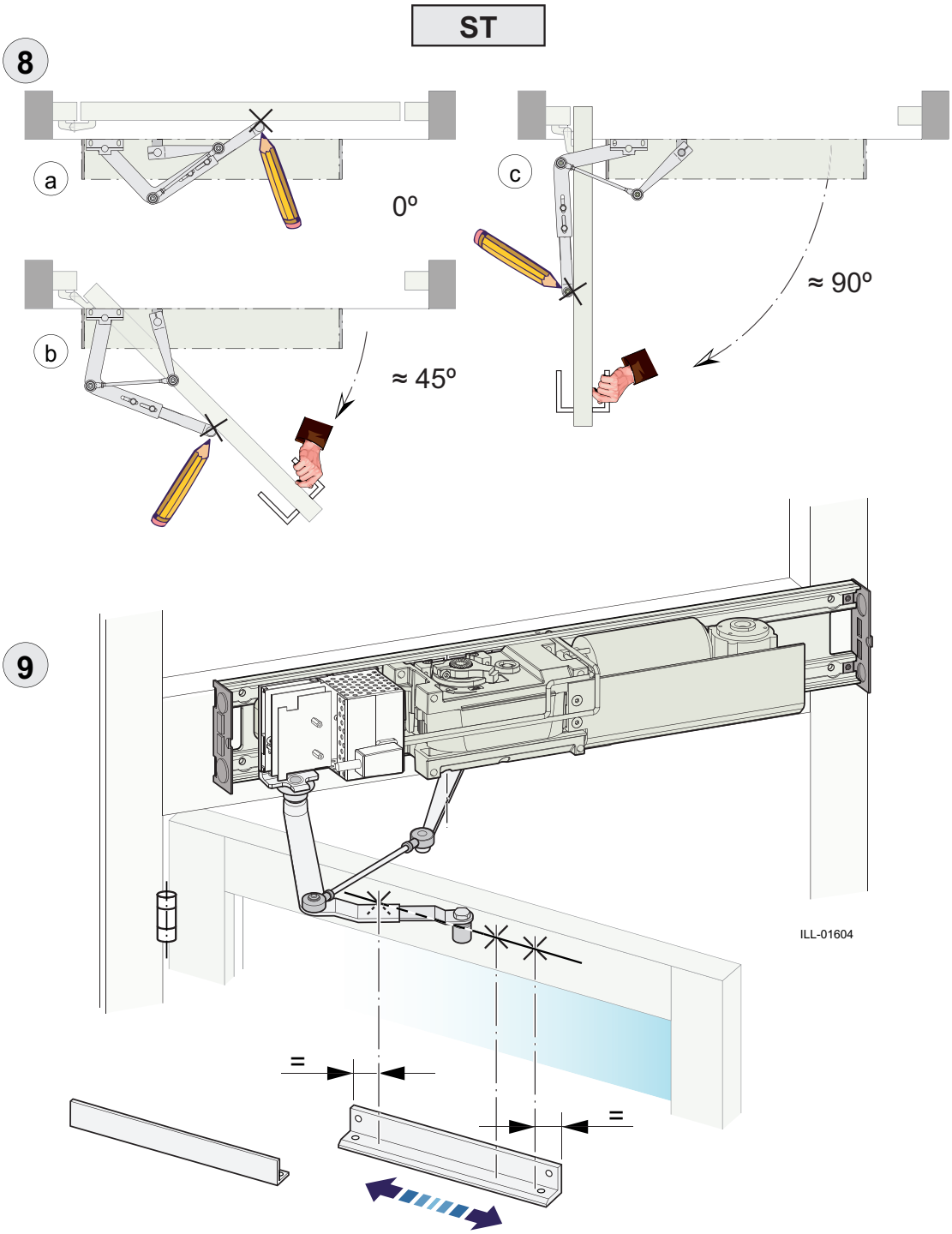
6



7



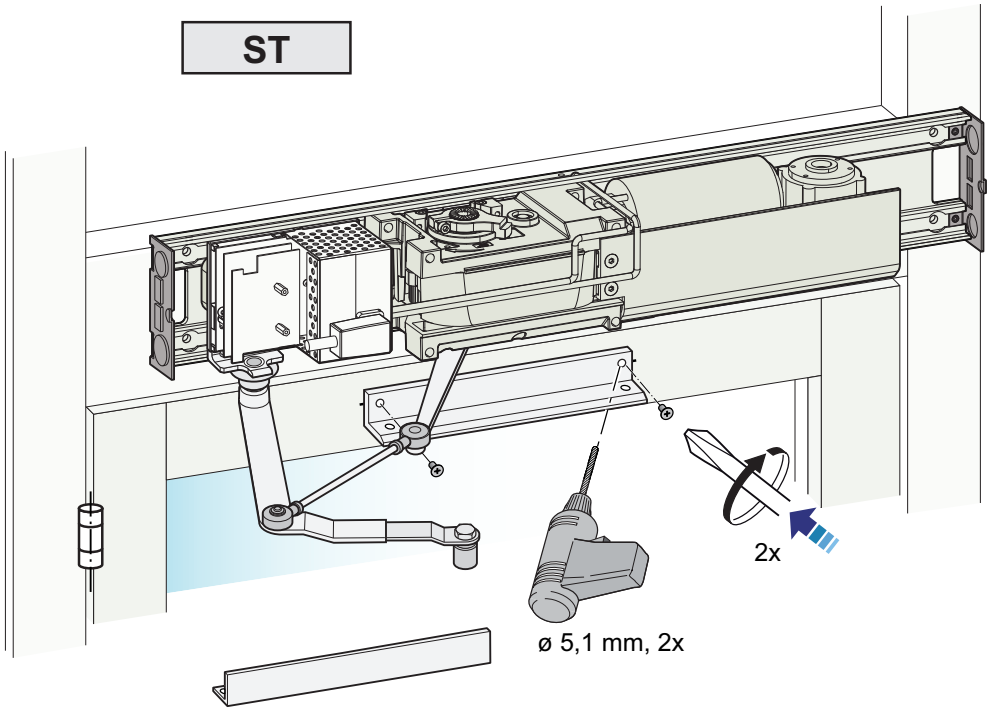
Cont. "Installation of operator with arm system ST"



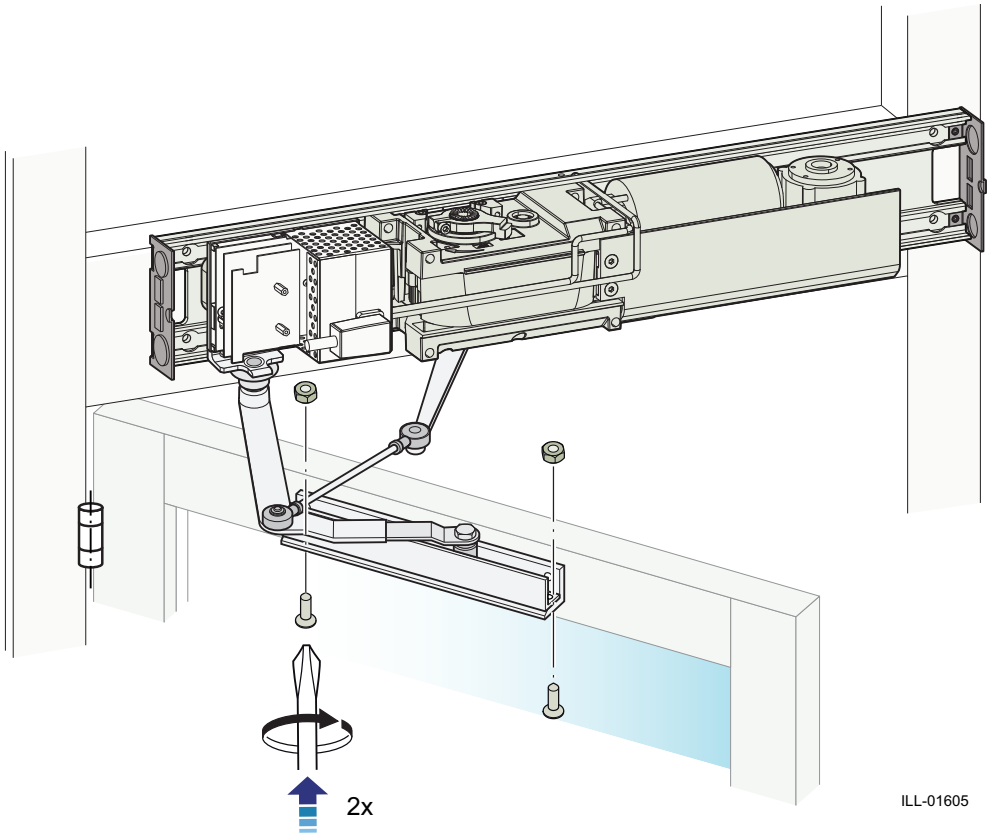
Cont. "Installation of operator with arm system ST"

10

ST

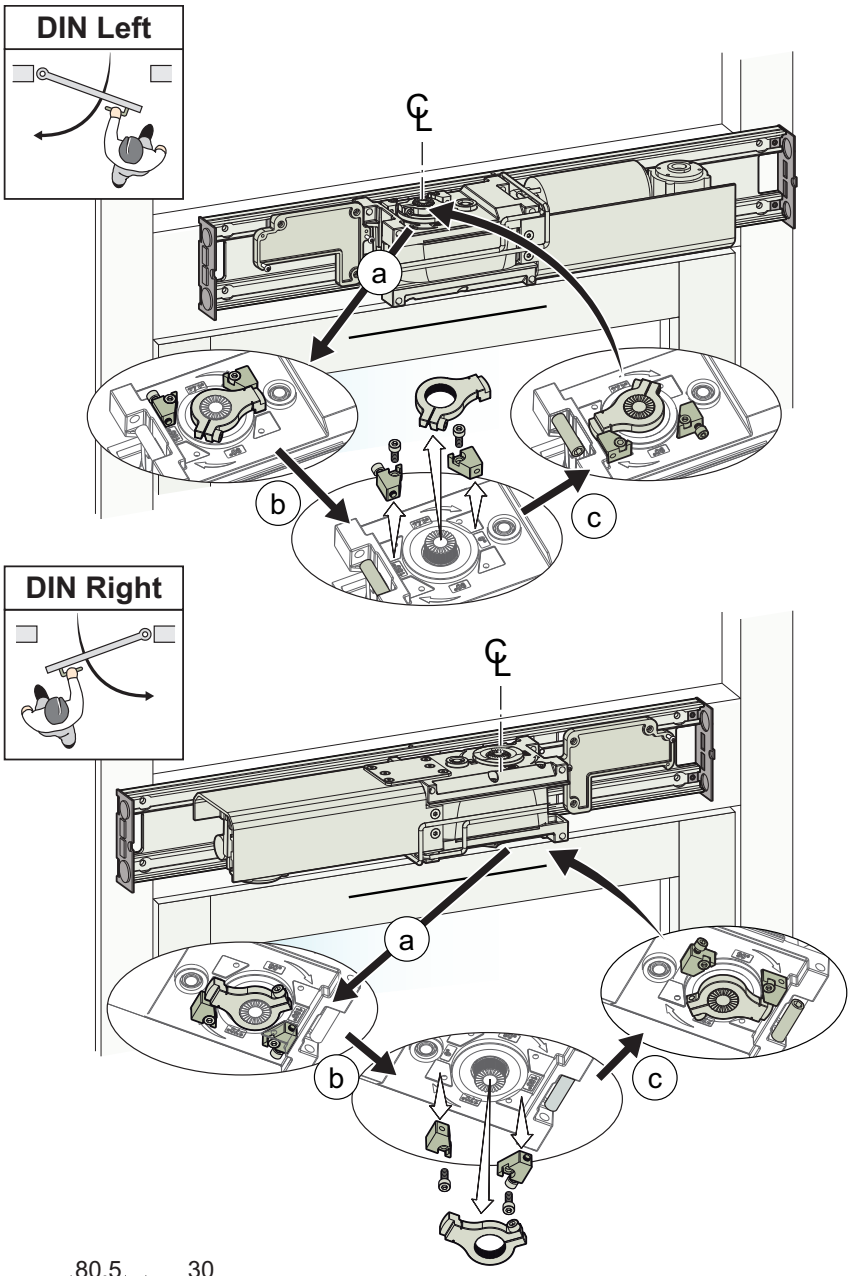


11

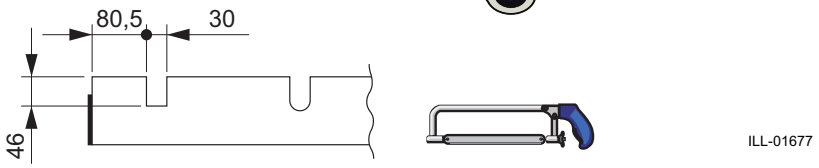


Cont. "Installation of operator with arm system ST"

12



13



Cut out for arm bracket

9 Electrical connection

Note! During any work with the electrical connections the **mains power** must be disconnected.

- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

9.1 Mains connection

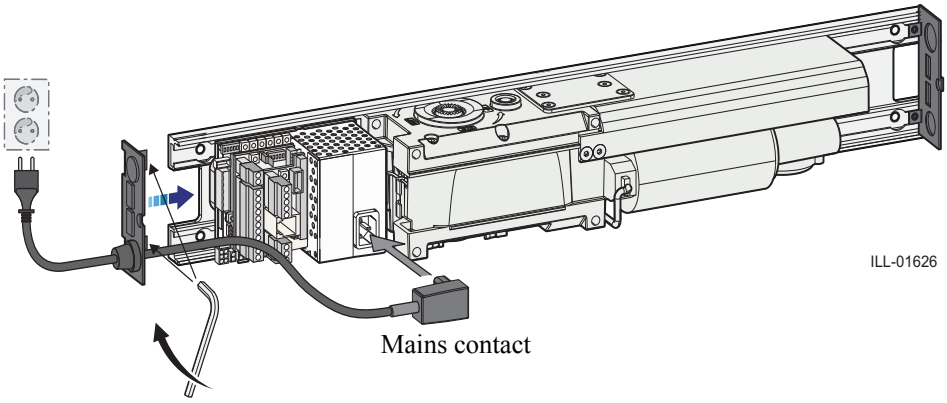
a Switch off the mains power.
b Assemble the bottom end plate and tighten the two screws firmly.
c Connect the plug contact to the wall socket or connect to the mains switch.

Note! The mains switch must be connected according to national regulation.

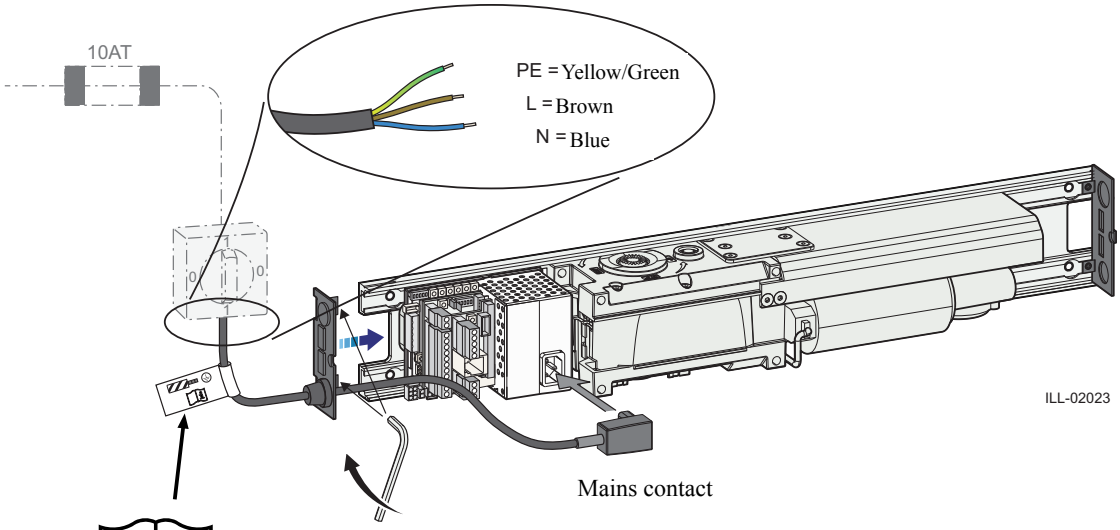
d Connect the mains contact to the operator.

Mains power:100-240 V AC – 50/60 Hz

Alt. 1



Alt. 2

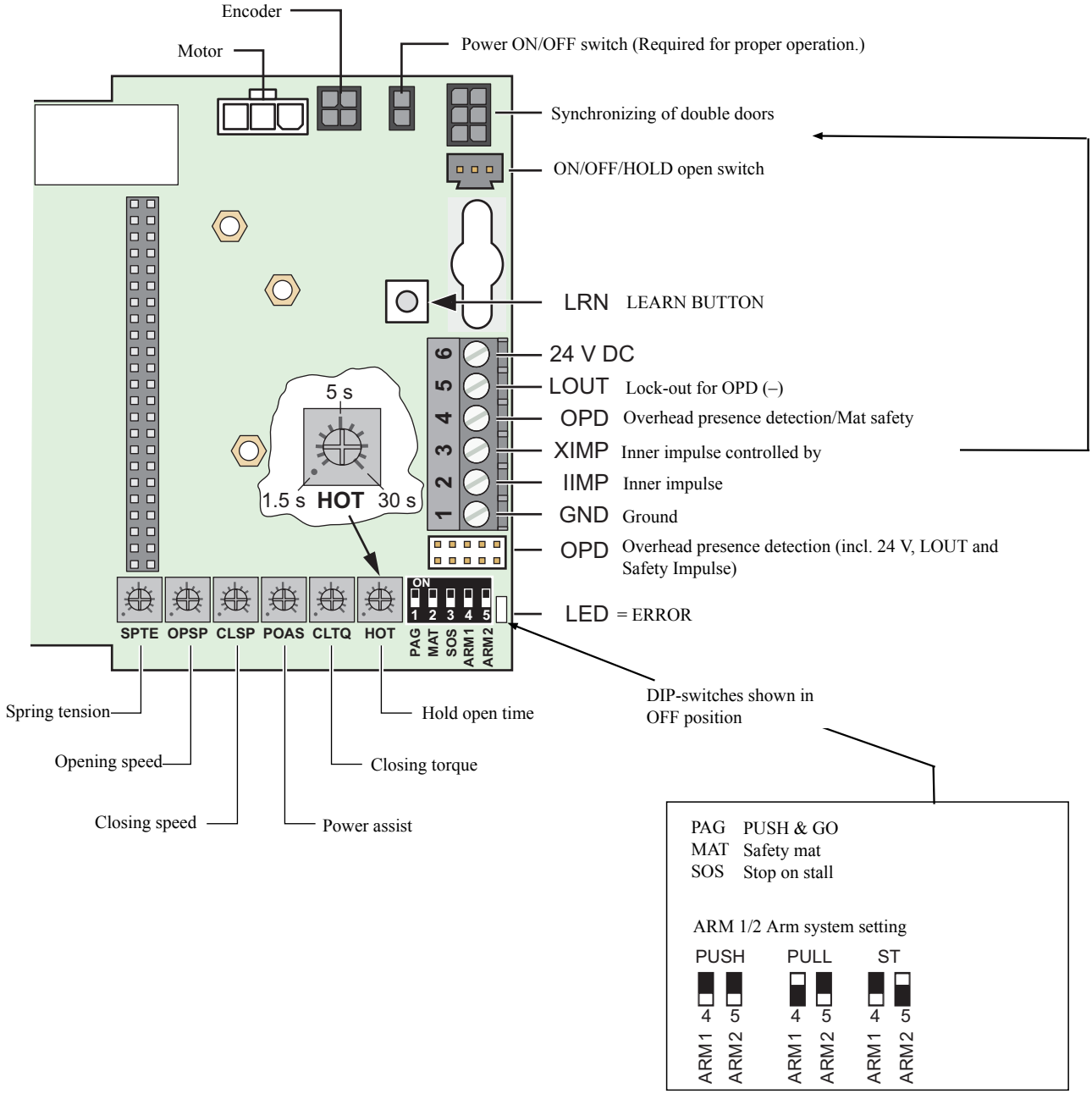


Symbol shown to ensure that the manual is read before the installation starts.

9.2 Control units

9.2.1 CU-ESD

The CU-ESD can be equipped with extension units, EXU-SI and/or EXU-SA, depending on the functions required. See page 10 or 11.



9.2.2 Arm system selection

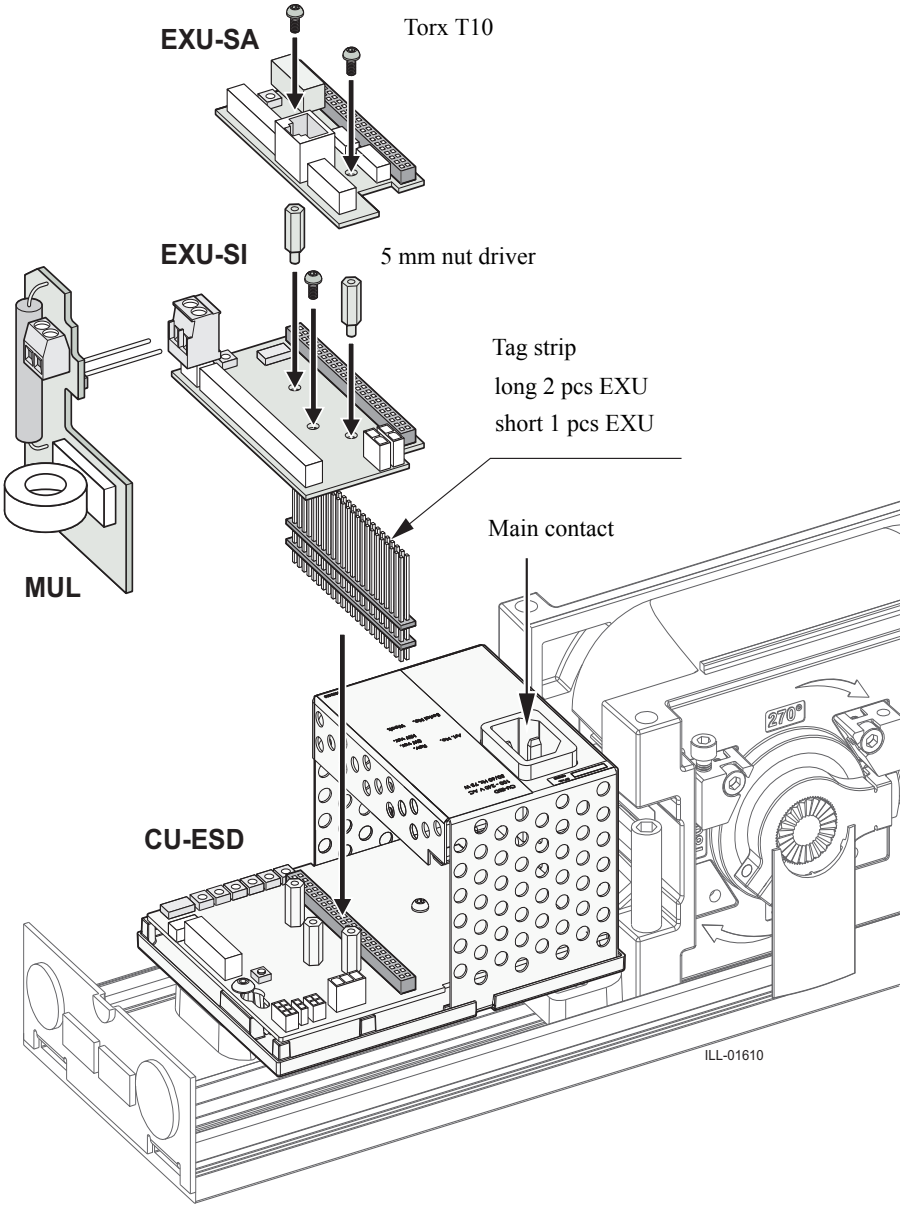
Factory set arm configuration is PUSH, if PULL or ST is required:

a Switch power OFF
b Select arm configuration
c Switch power ON

9.2.3 Extension units EXU-SI / EXU-SA

Installation

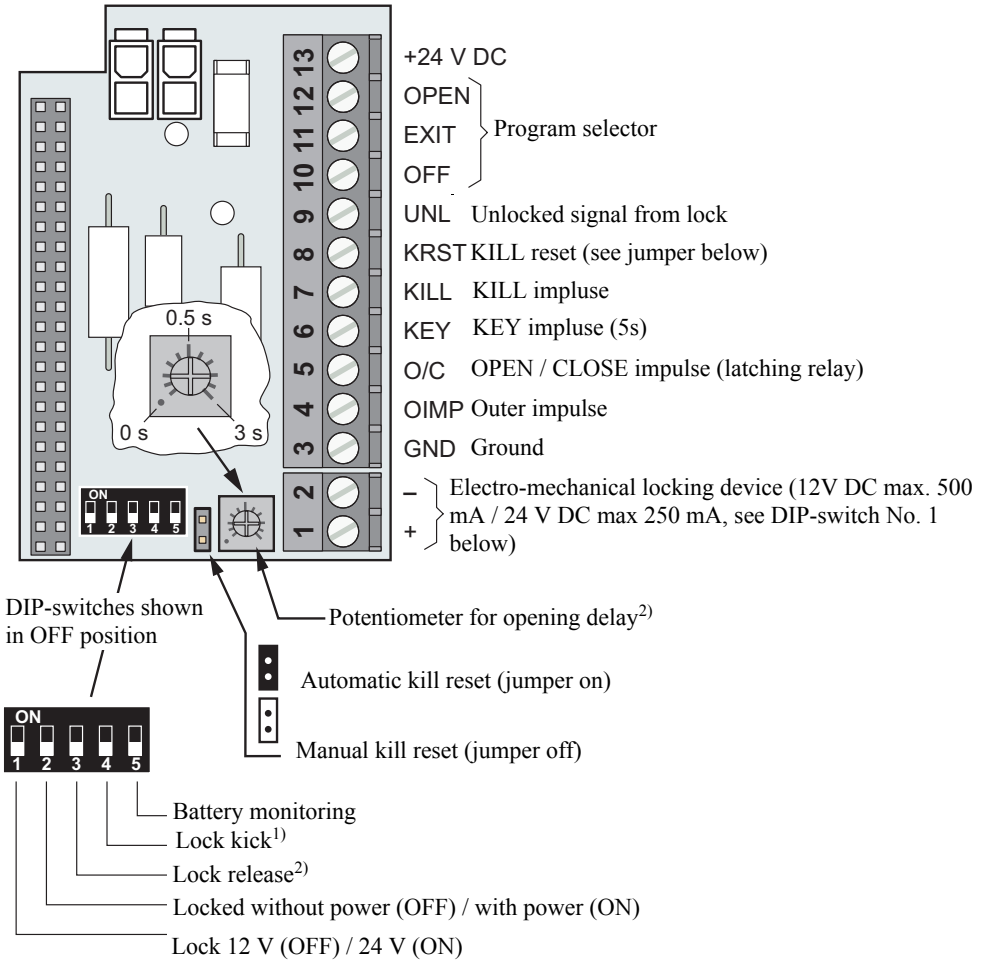
To extend the functions, the extension units can be mounted on top of the control unit CU-ESD, **separately** or combined.



9.2.4 Extension unit EXU-SI

Functions

This extension unit has inputs for electro-mechanical lock, program selector, batteries, KILL function, OPEN/CLOSE, KEY opening and outer impulse.



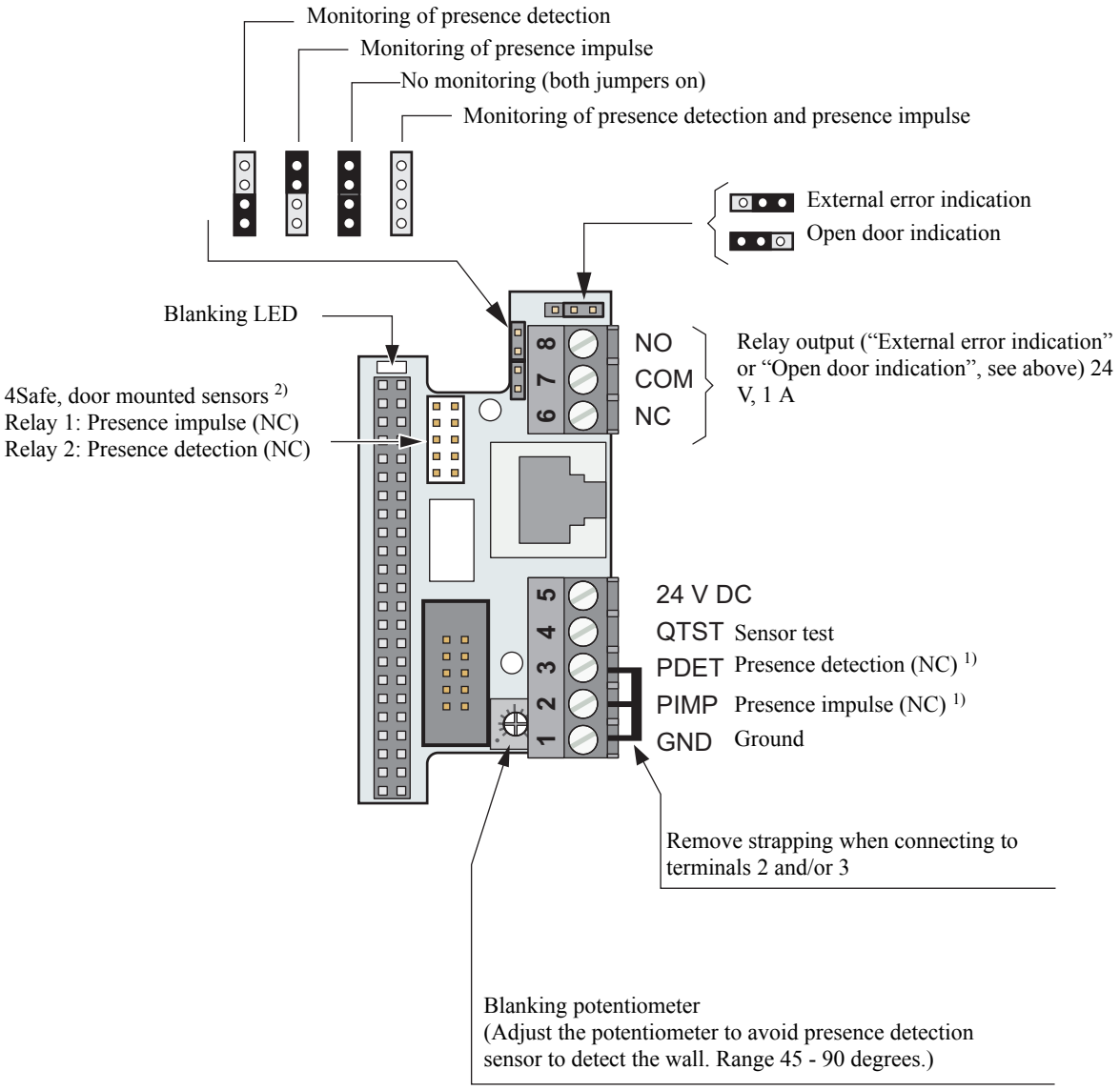
1) Position OFF: Smooth closing, to be used on doors without lock.
Position ON: More powerful closing, to be used on doors with lock, to overcome binding in the locking device.

2) If the switch is set to ON, the LOCK RELEASE is active during the opening delay time set by the potentiometer. For PAIR OF DOORS installations, the LOCK RELEASE works in sequence: First the MASTER then the SLAVE.

9.2.5 Extension unit EXU-SA

This extension unit has inputs for door mounted sensors, which can give presence impulse on approach side and/or presence detection on swing path side. Relay output for error indication or door indication is also integrated.

Functions


Monitoring of presence detection
Monitoring of presence impulse
No monitoring (both jumpers on)
Monitoring of presence detection and presence impulse
External error indication
Open door indication
Blanking LED
4Safe, door mounted sensors 2)
Relay 1: Presence impulse (NC)
Relay 2: Presence detection (NC)
NO
COM
NC
Relay output (“External error indication” or “Open door indication”, see above) 24 V, 1 A
24 V DC
QTST Sensor test
PDET Presence detection (NC) 1)
PIMP Presence impulse (NC) 1)
GND Ground
Remove strapping when connecting to terminals 2 and/or 3
Blanking potentiometer
(Adjust the potentiometer to avoid presence detection sensor to detect the wall. Range 45 - 90 degrees.)

1) If not used strap to “Ground”.
2) Remove strapping from terminals 2 and/or 3.

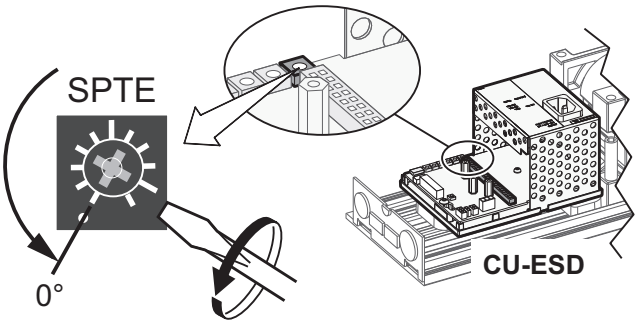
10 Start-up

The spring pre-tension is **factory set to 210°** and is normally not necessary to adjust. If adjustment has to be carried out “Reducing / Increasing the “Spring pre-tension” (SPTE)” on page 63.

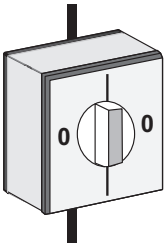
10.1 Adjusting the door stop

a Close the door.

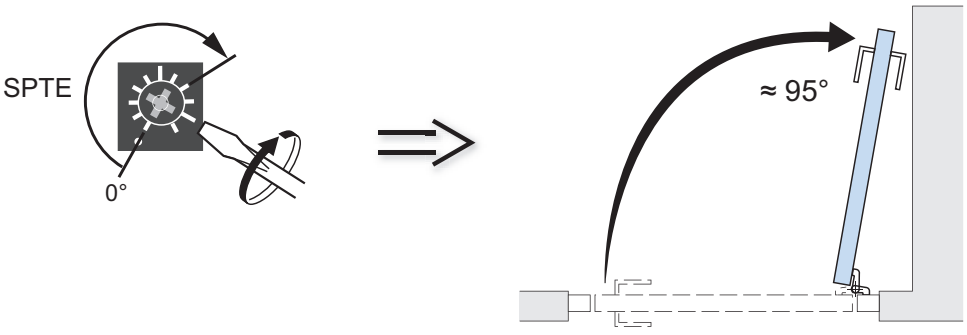
b Turn the potentiometer SPTE to 0° (if not already on 0°).



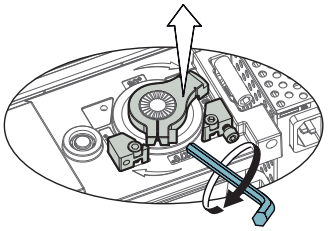
c Switch on the mains power (the operator will find its closed position).



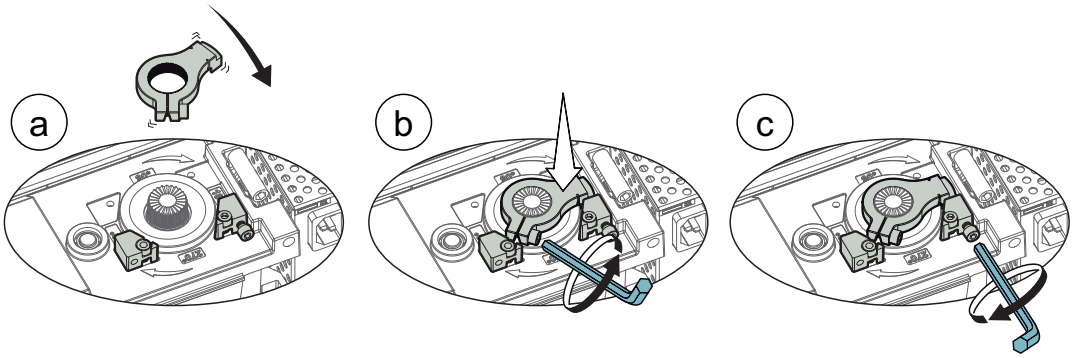
d Open the door to required open position, plus approx. 5/8” (15 mm), by turning the potentiometer SPTE on the CU-ESD, clockwise.



e Loosen the door stop arm.

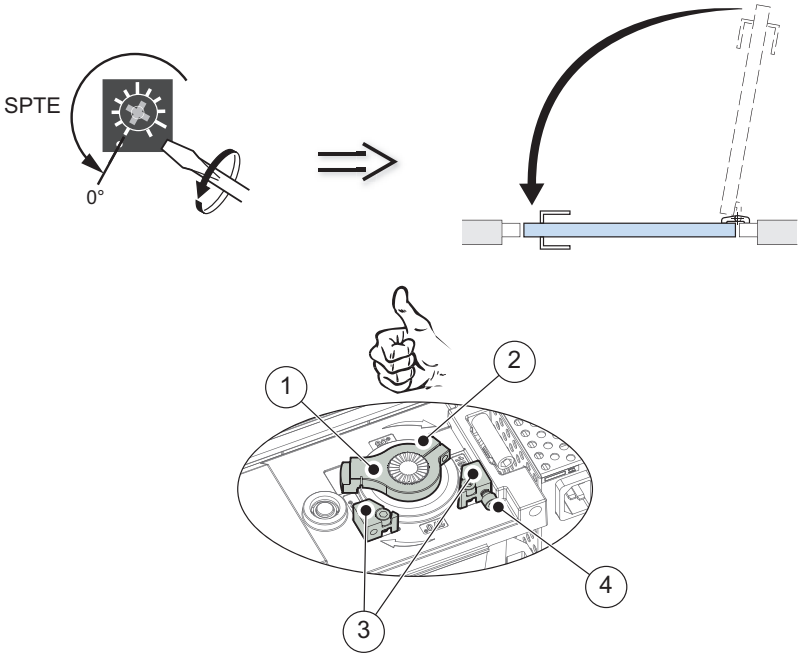


f Mount the door stop arm on the splines a), as close as possible to the stop block b). Fine-adjust if necessary with the screw on the stop block c).



g Close the door by turning the potentiometer SPTE to 0° and let the door close.

Note! Impulses are not accepted if SPTE is more than 0°.

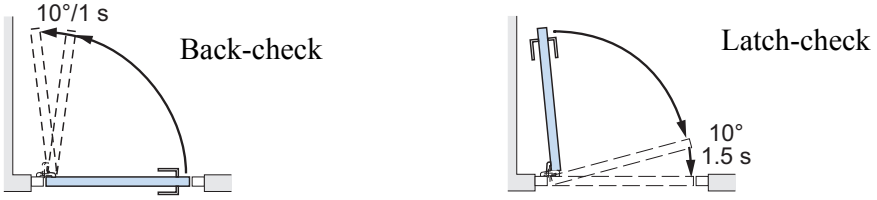


1 Door stop arm
2 Fixing screw
3 Stop block
4 Fine-adjustment screw

10.2 Auto-learn – automatically sets back and latch check (recommended)

This learning is performed by pushing the LEARN BUTTON (LRN).

- Before the learning procedure starts, make sure that the door has been properly closed i.e., not by force.
- If any of the parameters SPRING PRE-TENSION, CLOSING TORQUE (CLTQ) and LOCK RELEASE (DIP-switch No. 3 on EXU-SI) are changed after performing a learn, a new learn must be carried out.
- Learn can be carried out with activation units and locks connected.
- The back-check will be automatically adjusted to 10° and 1 second before open position. The latch-check will be automatically adjusted to 10° and 1.5 seconds before closed position.



10.2.1 One push / two pushes on the LEARN BUTTON (LRN)

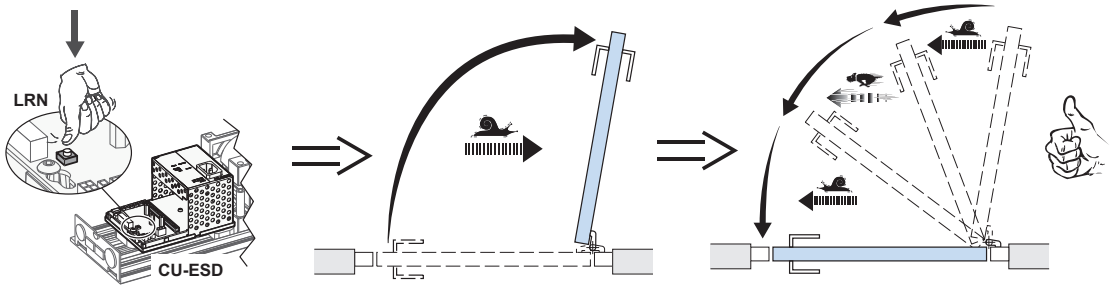
Note! Remain clear of swing path of door, as door may close rapidly. The door has no safety during auto-learn cycle.

One push (delayed opening)

Push the button once. The door will open after 2 seconds and adjust the back-check and latch-check automatically.

Two pushes (direct opening)

Push the button twice. As above, but the door starts to move directly.



10.2.2 Double doors

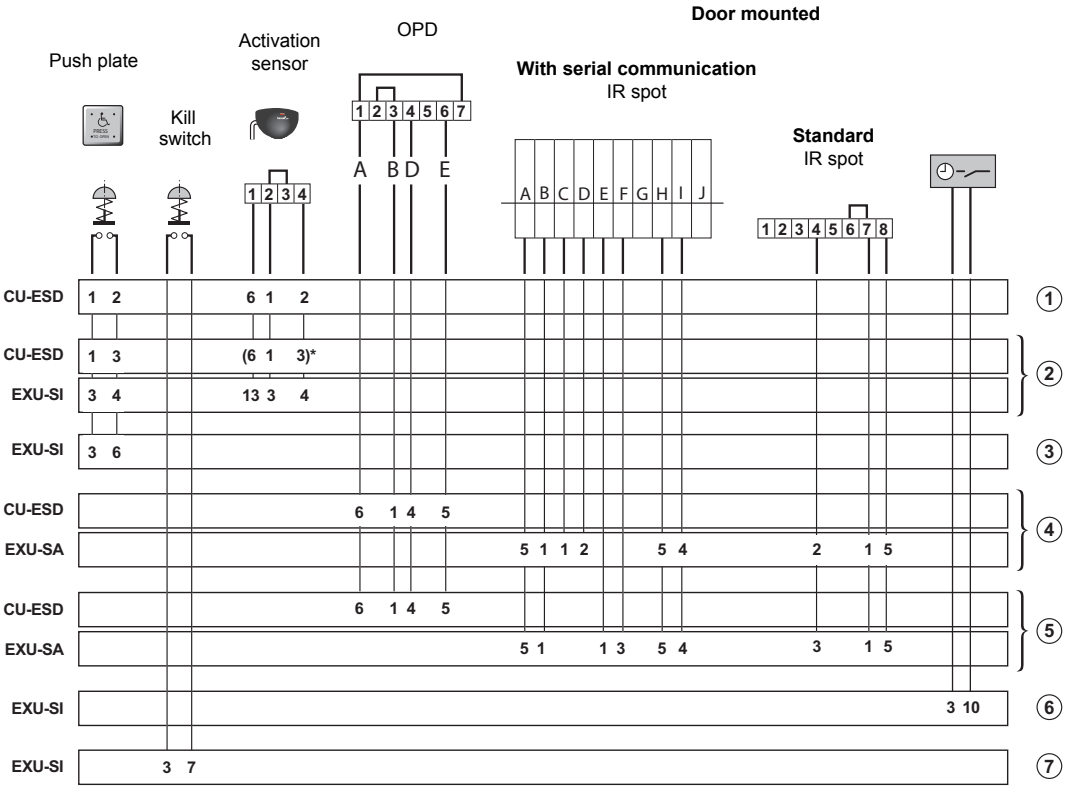
For double doors, the MASTER door must be learned first and thereafter the SLAVE door. When the SLAVE door is learned, the MASTER door will open up to fully open position during the learning phase of the SLAVE door.

The doors can also be learned separately before connecting the sync cable. In case of astragal doors and separate learning, the MASTER door must be held open before the SLAVE door learn is carried out.

10.3 General adjustment

a Set the hold open time with the potentiometer on the control unit.
b Adjust the opening speed (OPSP). Turning clockwise increases the speed.
c Adjust the closing speed (CLSP). Turning counter-clockwise decreases the speed.
d Connect the required activation units.
e Check that the installation complies with .

10.4 Connection of activation units and accessories


Door mounted
Push plate
Activation sensor
OPD
With serial communication
IR spot
Kill switch
Standard
IR spot
1 2 3 4 5 6 7
A B D E
A B C D E F G H I J
1 2 3 4 5 6 7 8
1 2 3 4
CU-ESD 1 2 6 1 2 ①
CU-ESD 1 3 (6 1 3)* ②
EXU-SI 3 4 13 3 4 ②
EXU-SI 3 6 ③
CU-ESD 6 1 4 5 ④
EXU-SA 5 1 1 2 5 4 2 1 5 ④
CU-ESD 6 1 4 5 ⑤
EXU-SA 5 1 1 3 5 4 3 1 5 ⑤
EXU-SI 3 10 ⑥
EXU-SI 3 7 ⑦

*

① Inner impulse
② Outer impulse
③ Key impulse
④ Presence impulse
⑤ Presence detection
⑥ Off
⑦ Kill impulse

A Red
B Black
C White
D Green
E Brown
F Blue
G Yellow
H Purple
I Grey
J Orange

11 Cover

The cover and back plate are manufactured in clear anodized aluminium. The end plates are made of black painted steel sheet.

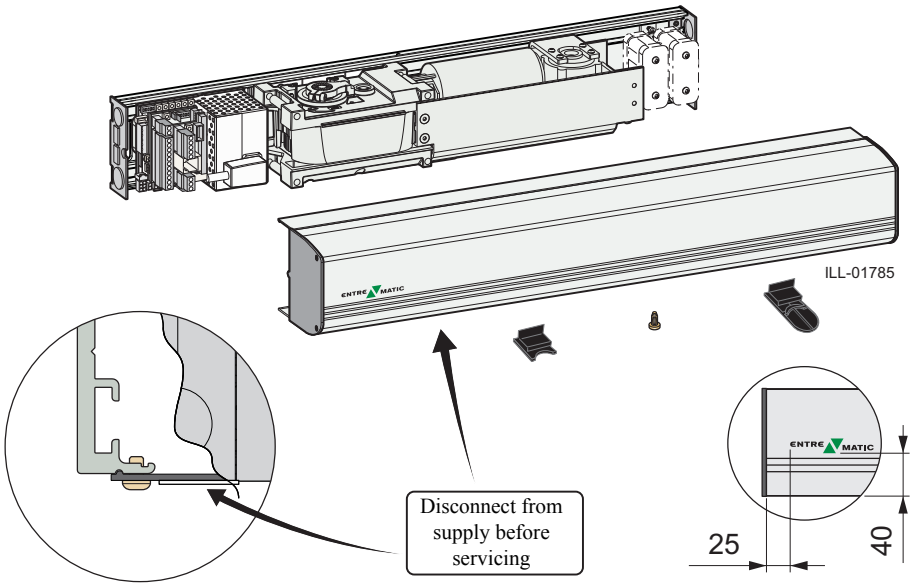
11.1 Fitting and removing the cover

The cover is slid over flanges in the back plate so that the ridges fit in the grooves.

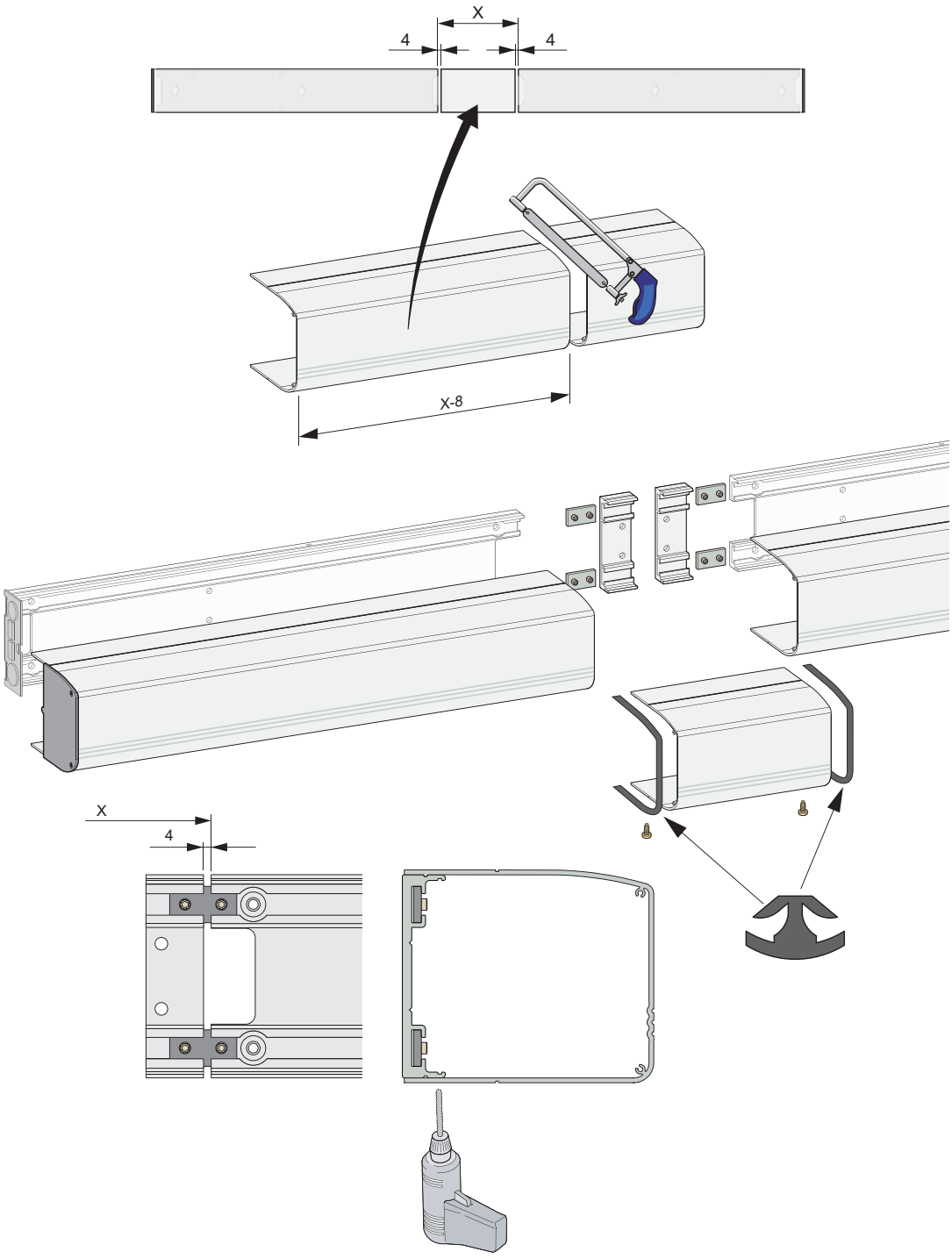
Break off and snap on the fill cover into the back plate for output shaft. Snap on the other fill cover for the second slot. Secure cover with the screw.

Stick the Entrematic logotype to the cover – see below.

If properly installed and adjusted, attach the product label, which includes the CE mark.



11.2 Middle piece cover

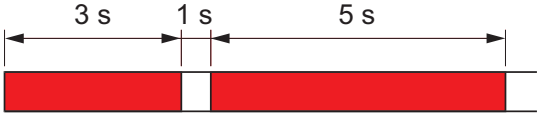


12 Signage

Action		If problem occurs
Check that all required signage is applied and intact. Mandatory indicates that the signage is required by European directives and equivalent national legislation outside the European Union.		
Ⓐ	Product label: Mandatory	
Ⓑ	Emergency break-out: Mandatory, if approved for escape route.	
Ⓒ	Entrematic door sticker: Mandatory, if applicable to highlight the presence of the glass (applied to all glass sections that are moving).	
Ⓓ	Supervision of child: Mandatory, if applicable (applied to both sides of the door). To be placed on entrances where the risk analysis shows use by children, elderly and disabled.	
Ⓔ	Operator designed for disabled people: Recommended, if applicable (applied to both sides of the door)	
Ⓕ	Activation by disabled people: Recommended, if applicable	

13 Changing group of parameters

a Disconnect batteries if any.
b Disconnect the mains contact.
c Press the LEARN BUTTON (LRN) and keep it depressed.
d Connect the mains contact.
e Watch the ERROR LED.



f Release the LEARN BUTTON after the 5 seconds (LED is out).

The ERROR LED flashes a number of short flashes that corresponds to the parameter group number (see table). After a short pause the LED will repeat the group number, and so on.

g Pushing the LEARN BUTTON once, increases the parameter group number. When the highest parameter group number is reached it will start with number 1 (default) again.
h Push the button until you get the requested parameter group.
i Disconnect the mains contact.
j Next time the mains is connected, the operator will use the new group of parameters.

Parameter/ Group	1 (default)	2	3	4	5	6	7	8	9	10
OPEN/CLOSE HOLD OPEN TIME	15 minutes	Infinite	15 minutes	15 minutes	15 minutes	15 minutes	15 minutes	15 minutes	15 minutes	15 minutes
BATTERY mode	Power Save	Power Save	Convenience	Power Save	Power Save	Power Save	Power Save	Power Save	Power Save	Convenience
KILL mode	Locked during KILL	Locked during KILL	Locked during KILL	Lock follows program selector during KILL	Locked during KILL	Locked during KILL	Locked during KILL	Locked during KILL	Lock follows program selector during KILL	Locked during KILL
OBSTRUCTION mode[1)]	Door closer	Door closer	Door closer	Door closer	Reverses when obstructed	Door closer	Door closer	Door closer	Door closer	Reverses when obstructed
DOUBLE EGRESS mode	Separate presence detection	Separate presence detection	Separate presence detection	Separate presence detection	Separate presence detection	Common presence detection	Separate presence detection	Separate presence detection	Separate presence detection	Separate presence detection
LOCK RETRY	On	On	On	On	On	On	Off	On	On	On
OPEN/CLOSE impulse	In AUTO mode	In AUTO mode	In AUTO mode	In AUTO mode	In AUTO mode	In AUTO mode	In AUTO mode	In OFF, EXIT and AUTO mode	In AUTO mode	In AUTO mode
KILL Impulse Configuration	Normally Open	Normally Open	Normally Open	Normally Open	Normally Open	Normally Open	Normally Open	Normally Open	Normally Closed	Normally Open

[1)] If set to REVERSES WHEN OBSTRUCTED, the operator re-opens when obstructed, similar to a presence impulse.

As default the operator tries to close two times extra in automatic operation, OFF or EXIT mode and one time in manual operation, OFF or EXIT mode if there is a problem with binding striking plates. This function can be switched off (see LOCK RETRY above).

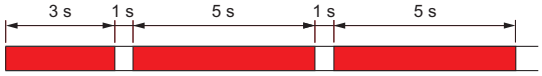
Note! When changing group of parameters, normally only the master control must be configured in a double door application. When changing from or to group seven, both MASTER and SLAVE must be configured.

14 Classification

14.1 Entering the program mode (classification)

If the operator is equipped with batteries, they must be disconnected before the following procedure is preformed.

- Disconnect the mains plug
- Press the LEARN BUTTON while connecting the mains plug
- Watch the ERROR LED



- Release the LEARN BUTTON after the second 5 s has passed

14.2 Identify the current classification

The ERROR LED flashes an amount of short flashes that correspond to the classification number.

After a short pause the LED will repeated the classification number and so on.

14.3 Changing the classification

If you push the LEARN BUTTON once, the classification number will increase. When you have reached the highest classification number it will start at number one again.

- Push the button until you get the requested classification
- Disconnect the mains plug

Next time you connect the mains the operator will use the new classification.

14.4 Classification table

Classification	1 (Default)	2
Opening speed	3-6 s	Automatic limitation according to DIN 18650-2 (and ANSI 156.19)
Closing speed	3-6 s	Automatic limitation according to DIN 18650-2 (and ANSI 156.19)

The fastest setting of Opening Speed and Closing Speed are automatically limited to the value in the table, and can only be reduced.

If this classification is used the operator will automatically follow the speed limitation in DIN 18650-2 (and ANSI 156.19).

The learn procedure must be carried out after a change of the classification setting.

Speed settings

The table shows minimum opening time to back check or to 80° open or minimum closing time from 90° to 10° open.

Width of door leaf (mm)	Door mass (kg)				
	50	60	70	80	90
	Time (s) min				
750	3,0	3,2	3,2	3,3	3,5
850	3,1	3,1	3,2	3,4	3,6
1000	3,2	3,4	3,7	4,0	4,2
1200	3,8	4,2	4,5	4,8	5,1

15 Advanced settings

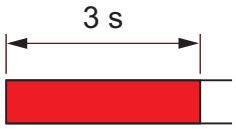
15.1 Learn with advanced setting of “back- and latch-check”

See the prerequisites for performing a “learn” under the heading “Auto-learn – automatically sets back and latch check (recommended)” on page 54.

a Push the button once or twice as for auto-setting.
b Stop the door at required back-check.
c The door reverts towards closed position.
d Remove the stop.
e Stop the door at required latch-check.
f The door reverts to learn the fully open position.
g Remove the stop.
h The door reverts to closed position.

15.2 Revert to default values for “back- and latch-check”

a Disconnect batteries if any.
b Disconnect the mains contact.
c Press the LEARN BUTTON and keep it depressed.
d Connect the mains contact.
e Watch the ERROR LED.



f Release the LEARN BUTTON after 3 seconds (LED is out).
g The BACK CHECK, LATCH CHECK and OPEN POSITION have now reverted to default values.
h Disconnect the mains contact.
i Next time the mains is connected, the operator will use the default values.

15.3 Reducing / Increasing the “Spring pre-tension” (SPTE)

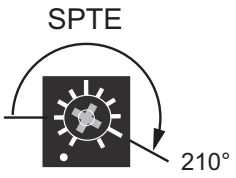
The spring pre-tension is **factory set to 210°** and is normally not necessary to adjust. If adjustment has to be carried out see below.

a Loosen the door stop arm. Remove if fitted on the topside, slide down if fitted on the bottom.
b Turn the potentiometer for spring pre-tension (SPTE) clockwise until the door opens to 45°.
c Loosen the drive arm fixing screw.
d Moving the door **towards open position**, reduces the tension, or:

Moving the door **towards closed position**, increases the tension.

e Tighten the drive arm.
f Turn the potentiometer SPTE to 0°.
g Open the door to required open position, plus approx. 15 mm, by turning the potentiometer SPTE clockwise.
h Mount the door stop arm as close as possible to the open door stop block, fine- adjust with the screw if necessary.
i Turn the potentiometer SPTE to 0°.
j Push the LEARN BUTTON.
k Let the door do the learn cycle without touching it.

Note! Max. allowable spring pre-tension is 210°. Over-tension may damage the spring or overheat the motor.



16 Installation and adjustments

16.1 Complementary Safety Devices Swing Doors

If there is any risk for finger jam, add finger protection strip at the hinge side for internal doors, article No. 833334 or add finger protection roll for external doors, article No. 833333.

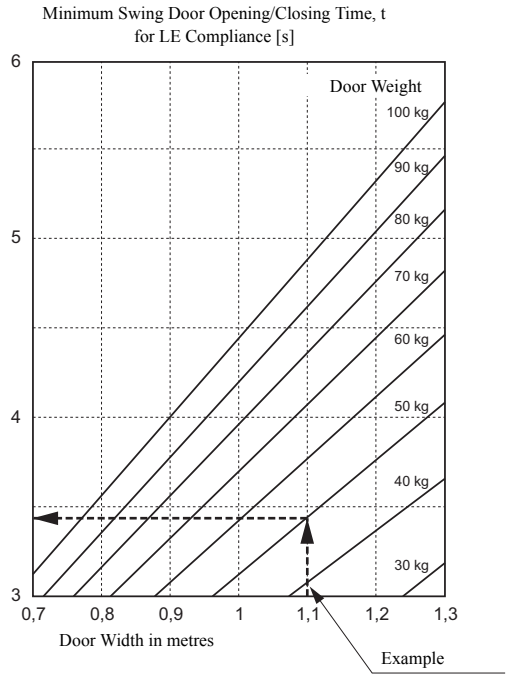
16.2 Swing Doors Opening and Closing Time

Adjust, as a minimum, the operator's opening and closing time according to the diagram below.

16.2.1 How to find the correct opening and closing time

- Measure the door width.
- If the door weight is unknown, follow the instructions in “Diagrams for door weight”.
- Go into the diagram below to find the correct minimum opening/closing time “t”.

Example: If the door width is 1,1 m and the door weight is 50 kg the minimum opening and closing time will be ~3,5 seconds.



16.3 Diagrams for Door weight

a Measure the door width (DW) and the door height (DH) in metres for one door leaf only.

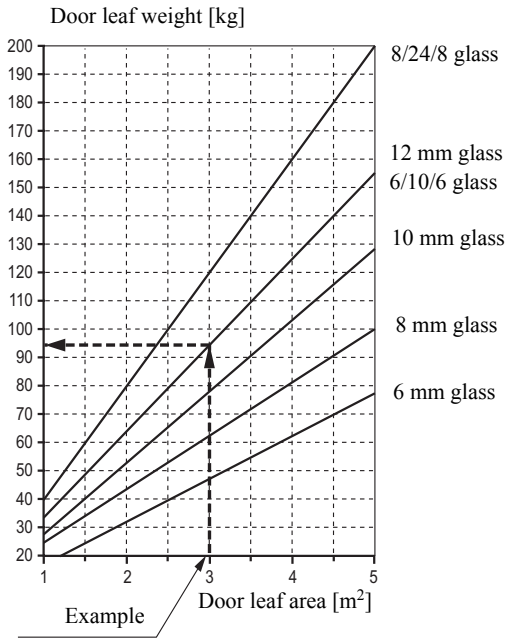
b Calculate the area DW x DH.

c Select diagram for your type of door and the actual glass thickness. Find the weight.

Example: Aluminium door with measurement DW = 1.5 m, DH = 2 m and glass thickness 12 mm. Calculate 1.5 x 2 = 3 m^2. Look into the first diagram for “Aluminium Frame with glass”. Start with the area and follow the line up to the 12 mm glass, go left to receive the door weight 95 kg.

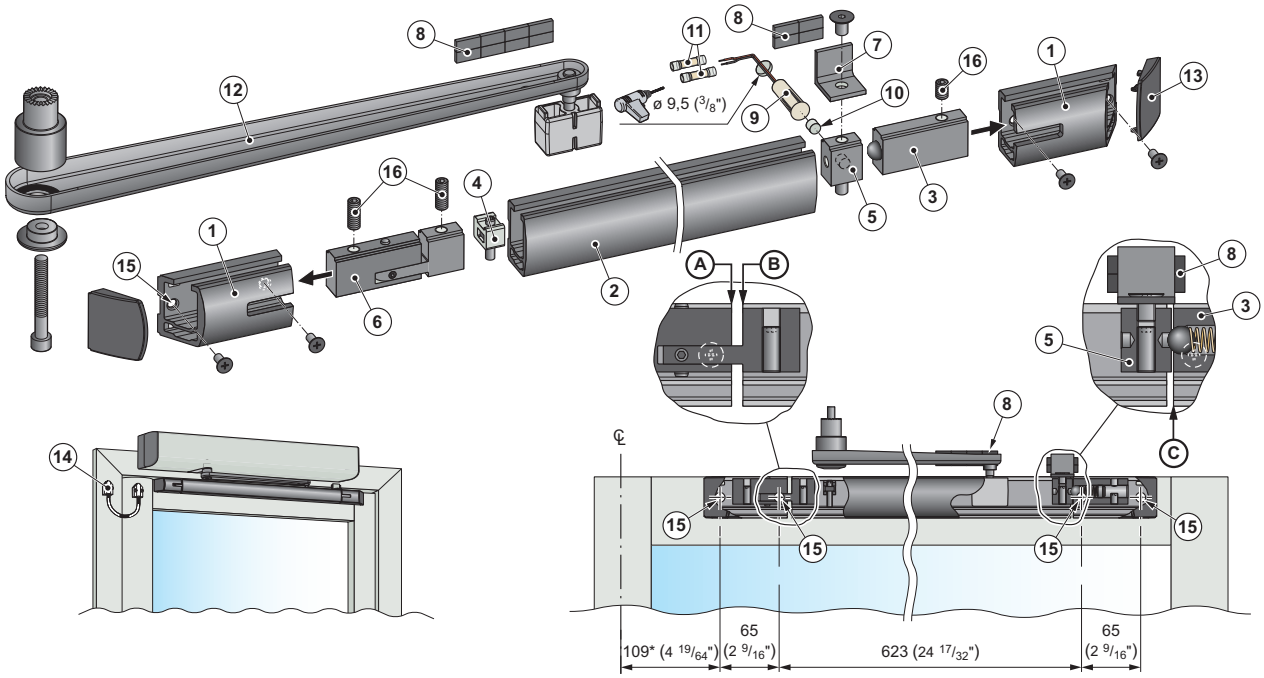
Note! The weights can vary depending on the door design (the table shows only typical values).

16.3.1 Aluminium frame with glass



17 Installation instructions for Accessories

17.1 Armsystem PULL-P



① Short slide track	⑦ Door stop	⑬ End caps
② Long slide track	⑧ Rubber absorber	⑭ Flexible steel hose FLS
③ Ball catch	⑨ Magnetic switch G1	⑮ Fastening hole (4 pcs)
④ Arm stop	⑩ Magnet	⑯ Lock screws
⑤ Ball seat	⑪ Crimp connectors	⑰ Reveal spacer (optional) 40 / 60 mm (1 37/64" / 2 23/64") Art. No. 173 831BK
⑥ Hinge	⑫ Drive arm	

17.1.1 Mounting instruction for magnetic switch G1

To make sure that the operator is disconnected when the door is paniced a switch must be connected to kill.

a Drill a 9.5 mm (3/8") hole in the door leaf just behind the magnet for the magnetic switch G1.

b Extend the cable length for the switch G1.

c Mount the magnetic switch G1 and the flexible steel hose FLS in accordance with the picture.

d Connect G1 to kill.

17.1.2 Installation of PULL-P

a Mark and drill the 4 fastening holes ø 4,6 (3/16") in the door leaf.

b Mount the two short slide tracks.

c Slide the hinge into the short slide track next to the door hinge and make sure they are aligned (A). Secure with the lock screw.

d Slide the long slide track into the hinge and make sure they are aligned (B). Secure with the lock screw.

e Slide the ball catch into the short slide track at the front of the door and make sure they are aligned (C). Secure with the lock screw.

f Slide the arm stop into the long slide track. Position it close to the hinge and secure it with the lock screw (will be adjusted later).

g Slide the drive arm with its guide shoe into the long slide track.

h Slide the ball seat into the long slide track. Make sure the magnet is facing the door.

i Close the slide track and press the ball seat against the ball catch. Secure with the lock screw.

j Mount the door stop on the ball seat.

k Fix the rubber absorber at the door frame behind the door stop.

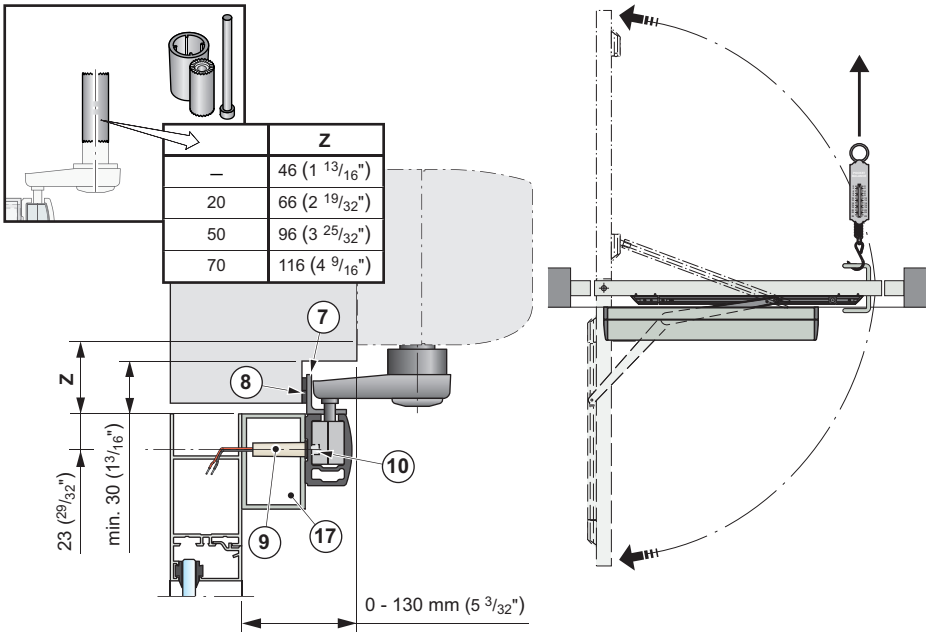
l Adjust the spring pre-tension on the ball catch to its maximum and then release 2 turns.

m Mount the drive arm to the operator (see installation manual).

n Check break-out force with a balance by pulling the door into panic direction. Max force must not be higher than 220 N (49 lbf). Adjust if necessary.

o Stick the rubber absorbers to the frame just behind the arm.

p Snap on the two end caps to the slide track.



18 Troubleshooting

Fault	Possible reasons why	Remedies/Explanations
The door does not open The motor does not start	Control switch is set to OFF	Change the setting of the control switch
	Mains power is missing	Check the mains power switch
	Activation unit does not function	Strap impulse inputs
	Presence detection is activated	Check that there are no objects in the detection zone
	KILL activated	Deactivate KILL
	Potentiometer SPTE not turned to 0°	Turn SPTE to 0°
The motor starts	Mechanical lock is locked	Unlock the lock
	Something jammed beneath the door	Remove object
	Electric striking plate is binding	Select lock release
		Adjust striking
	Arm system has come loose	Turn potentiometer SPTE until the door-stop hits the stop-block. Put the door in required open position. Tighten the arm system. Turn SPTE to 0°
The door does not close	Control switch is set to HOLD	Change the setting of the control switch
	Presence impulse is activated	Remove objects in the detection zone
	Something jammed beneath the door	Remove object
The operator has unknown spring pre-tension	Too many adjustments carried out	a Turn up the potentiometer SPTE until it is possible to loosen the door stop b Remove the door stop and the arm system c Unplug the mains and let spring close d Unplug the motor plug e Mount the drive arm from the arm system and find the o-pre-tension by moving back and forth f Loosen the arm g Connect the motor plug h Connect the mains i Adjust the SPTE to 210º j Mount the door stop against the closing stop block k Turn down SPTE to 0º - operator is now factory set

18.1 Error indication

- During normal operation the ERROR LED on the control unit is illuminated.
- An extinguished LED indicates that there is no mains power.
- A flashing light on the LED indicates that the operator is out of function (see table below).
- An audible warning signal can be achieved by using the accessory board AIU. It is connected to the 24 VDC and plugged into the EXU-SA relay output terminal.

LED flash frequency	Reason	Remedy
One 0.3 s flash, pause etc.	+ 24 V DC external error or sensor monitoring error	Check for short circuit or broken monitored sensor
Two 0.3 s flashes, pause etc.	Battery defective	Replace battery (normal operation with mains power)
Three 0.3 s flashes, pause etc.	Control unit defective	Replace control unit
Four 0.3 s flashes, pause etc.	Encoder error	Check the encoder cable. Open and close the door manually and thereafter check the automatic function. If the operator is still out of function replace the drive unit.
Five 0.3 s flashes, pause etc.	Locking device defective	Check for e.g. short circuit in the locking device
		Replace locking device
	EXU-SI board defective	Replace EXU-SI board
Six 0.3 s flashes, pause etc.	Sync cable not connected or defective (double door only)	Connect the sync cable
		Replace the sync cable
Seven 0.3 s flashes, pause etc.	SLAVE control unit defective (double door only)	Check the flash frequency on the SLAVE LED and take necessary measures in accordance with this table.
Eight 0.3 s flashes, pause etc.	Motor overheated	Wait for the motor to cool down
Nine 0.3 s flashes, pause etc.	Blocked door and constant impulse	Toggle impulse

19 Maintenance plan

Regular inspections shall be made according to national regulations by a trained and qualified person. The number of service occasions shall be in accordance with national requirements. This is especially important when the installation concerns a fire-approved door or a door with an emergency opening function.

As with all other technical products, an automatic door needs maintenance and service. It is essential to know the importance of maintenance to have a reliable and safe product.

Service and adjustments will ensure a safe and proper operation of an automatic door unit.

The table below shows the recommended interval, in months, when to replace parts during preventive maintenance.

Part	Part number	Cycles/hour in operation			Abusive Environment
		<10	<100	>100	
		Low traffic	Medium traffic	High traffic	
PUSH service kit	331003888	24	12	6	6
PULL/PULL-P service kit	331003886	24	12	6	6
ST-V/H service kit	331003887	24	12	6	6
Battery backup unit *	1003567	24	24	24	24
CU-ESD control unit	331003532	60	60	60	60

* Mains must be switched off when replacing battery

Ditec Entrematic Nordic AB, Box 669, SE-261 25 Landskrona, Sweden
Tel: +46 418 514 50 • Fax: +46 418 511 63
info@ditecentrematicnordic.com • www.ementrematic.com